Wood's Medical
and Atlases

Essentials of Gynecology
by
O Schaeffer, M.D.

before been equalled or approached for cheapness. The scientific faithfulness to nature of these plates is vouched for by the eminent medical gentlemen under whose direct supervision they have been drawn and colored. The volumes each contain from 50 to 75 or more full-page plates, many of them comprising several figures, together with appropriate descriptive text and a condensed outline of the subject to which it is devoted. These books are uniformly about five by seven and a half inches in size, most convenient for ready use and reference. The descriptive matter for each plate is always printed on the page facing it, for convenience of study.

For the subjects covered by the volumes now offered to the profession, see inside of back cover.

ATLAS AND ESSENTIALS

OF

GYNECOLOGY

BY

DR. OSCAR SCHAEFFER,

PRIVATDOCENT IN OBSTETRICS AND GYNECOLOGY AT THE
UNIVERSITY OF HEIDELBERG.

WITH 173 COLORED PLATE ILLUSTRATIONS
AND 54 WOODCUTS

NEW YORK

WILLIAM WOOD AND COMPANY

1897

PREFACE.

This atlas was undertaken with the idea that, although there are many excellent text-books, compendiums, and atlases on gynecology, there is no book which gives the student and physician the material which personal clinical observation should supply. If such a book were purely schematic, it would perhaps meet the requirements of many readers, but the actual state of affairs is not thus properly represented; while, on the other hand, an exact reproduction of anatomical preparations makes the distinction between the essential and incidental conditions difficult.

I determined, therefore, to combine the two methods, and in addition to drawings from nature to emphasize any variation from the normal. I have further sought to present the various subjects from as many points of view as possible; that is, to give the etiology, development, secondary complications, termination, or recovery; and have therefore added schematic and partly schematic drawings to the pictures of anatomical specimens.

That I am able to present almost entirely original anatomical and clinical material is due to my former connection as assistant with the Gynecological Clinic in Munich; as well as to the kind permission and in-

spiring advice of Herr Geheimrath von Winckel, to whom, as well as to Herr Geh. Hofrath·Kehrer, who so kindly allowed me the use of his clinical material, I wish to express my most sincere thanks.

I have divided the work into two parts. The text has been made as practical as possible. The plate explanations contain the purely scientific, anatomical, microscopic, and clinical notes, and matters of general importance (sounds, pessaries, etc.).

Naturally, in my "Atlas of Obstetrics" a great many normal anatomical conditions had to be discussed, and furthermore the puerperal conditions and many gynecological diseases stand in interchangeable relation, hence I have tried to avoid repetition by cross references.

I have chosen to arrange the material as far as possible on an etiological basis. As this principle, if carried too far, would have led to diffuseness, the chapter on sepsis is made to include also puerperal fever, gonorrhœa, tuberculosis, and venereal diseases. Cystitis, which often comes into the hands of gynecologists, I have treated separately.

I have tried especially to simplify the matter of differential diagnosis, and to that end have chosen the method of comparative tables (see the sections on myoma, cystoma, carcinoma, tumors of Douglas' pouch, ante-uterine tumors, etc.).

<div align="right">O. SCHAEFFER.</div>

HEIDELBERG, November, 1895.

CONTENTS.

PART I.

MALFORMATIONS AND ARRESTS OF DEVELOPMENT.

PART II.

CHANGES IN SHAPE AND POSITION.

PART III.

INFLAMMATIONS AND TROPHIC DISTURBANCES.

PART IV.

INJURIES AND THEIR SEQUELÆ.

PART V.

NEOPLASMS.

LIST OF PLATES.

ILLUSTRATIONS IN THE TEXT.

Tab. 1.

Explanation of Plate 1.

VULVA OF NON-PREGNANT MULTIPARA.

(Original water-color drawing of a case from the Heidelberg Clinic for Women.)

Labia majora and minora are separated. A blind congenital canal, 1 cm. deep, is to be seen at the posterior commissure, near the remains of the hymen. (The author found analogous formations in fœtuses: see *Arch. für Gyn.*, 37, 2; Plate VII., Fig. 19.) The perineum is intact.

Explanation of Plate 2.

FIG. 1.—Varicose veins of the labia majora, clitoris, and nymphæ (original water color). In the right labium majus is a hæmatoma (thrombus vulvæ); external hemorrhoids. This picture is most often seen in parturient women, also in puerperæ in whom the varicosities arise from venous stasis, the hemorrhage from wounding of the superficial vessels during labor. The latter may also be due to wounds, apart from pregnancy.

FIG. 2.—Ulcerating epithelioma of right labium majus (original water color), consisting at first of slightly red, flattened prominences and nodules. On the edge the tumor is bluish and hard; in the centre beginning degeneration. The tumor is of slow growth. Infiltration of inguinal glands. The vagina is rarely involved.

Histologically the epithelioma is composed of flattened epithelial cells (see Plate 45, Fig. 1). Fibrous carcinoma is very rare.

Fig.2.

Fig.1.

Fig.1.

Fig.2.

Tab. 3.
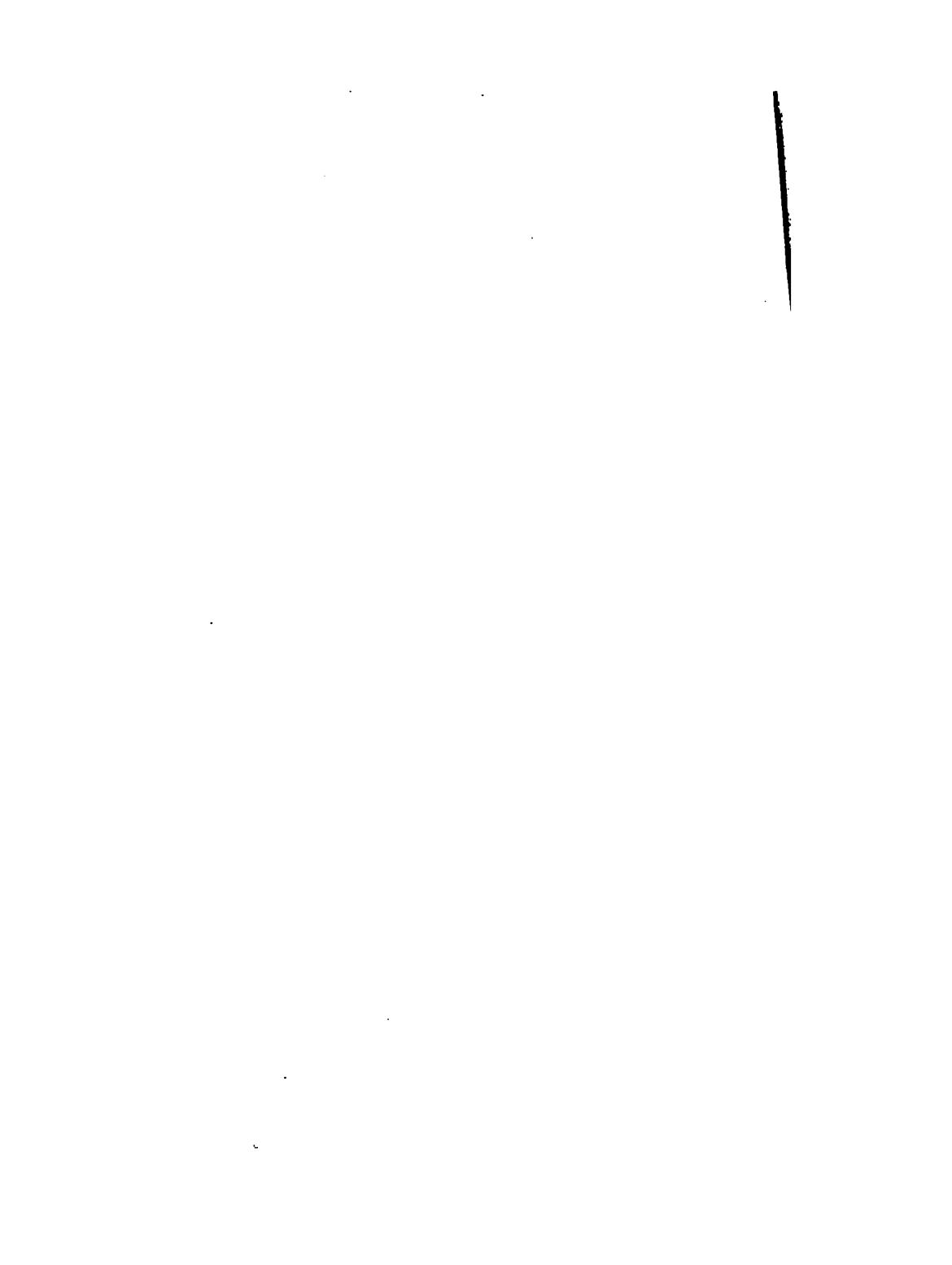
Explanation of Plate 3.

FIG. 1.—Elephantiasis of the vulva (original water color; case from the Munich Clinic for Women) starting from the right labium majus, with polypoid excrescences of the mucous membrane about the mouth of the urethra. The former springs usually from the deep connective tissue, and is made up of proliferated lymph capillaries (see Plate 6, Fig. 1), due partly to nerve changes, partly to stasis. Externally the growths may resemble papilloma, but the excrescences are fuller and flatter (see Plate 3, Figs. 1 and 2). Occasionally the tumors include the whole vulva. Their growth is slow, and they undergo great changes from swelling.

The mucous polyps about the urethra are found either at the external opening or at the neck of the bladder. They are made up of connective tissue as a rule, but occasionally they contain cysts, formed by retained secretion due to atresia of the openings of the glands of Skene (see Fig. 20 in the text, which shows their tiny mouths in the wall of the urethra). Other urethral tumors are varices, vascular proliferations, i.e., angiomata, also sarcoma and epithelioma.

FIG. 2.—Condylomata acuminata of the labia and hymen (original water color from a case at the Munich Clinic for Women) develop as papillomatous tumors, sometimes of good size. They are not always caused by gonorrhœa; generally speaking, however, they are the result of infection. Their microscopical structure is shown in Plate 6, Fig. 2.

Explanation of Plate 4.

FIG. 1.—Inversion of both vaginal walls, inguinal hernia of right labium (original water color). Both conditions are not rarely combined, since they are caused by relaxation of the supporting structures (the abdominal walls and pelvic floor, the lower walls of the vagina, the ligaments of the uterus, and the connective tissue which surrounds them). Comp. § 6. The lower part of the vagina next to the perineum is generally the part inverted. When it is the upper part, the abdominal organs or tumors (ovariocele, pyocele, etc.) are the immediate cause of the inversion, through pressure on the lumen of the vagina. In the former case, either the anterior, posterior, or both vaginal walls may prolapse. Inversion of the anterior wall is most frequent. The bladder may descend likewise, forming a cystocele, partly because it is firmly attached to the vaginal wall, and partly because it is pushed into the vagina by abdominal pressure. Rectocele is found much less often, the rectum not being in such close apposition to the vaginal wall; when it is present, the rectum has prolapsed first (see Plate 22 et seq.).

FIG. 2.—Suppurating right Bartholinian gland (original water color), caused by acute gonorrhœa. The gland lies beneath the labia minora and majora, and opens near the outer side of the hymen at its posterior third. At the same place are seen elastic tumors, without inflammatory appearance, which represent glandular retention cysts. Pollutions in women are caused by this gland.

4

Fig.2.

Fig.1.

Tab. 5.

Fig. 1.

Fig. 2.

Fig. 3.
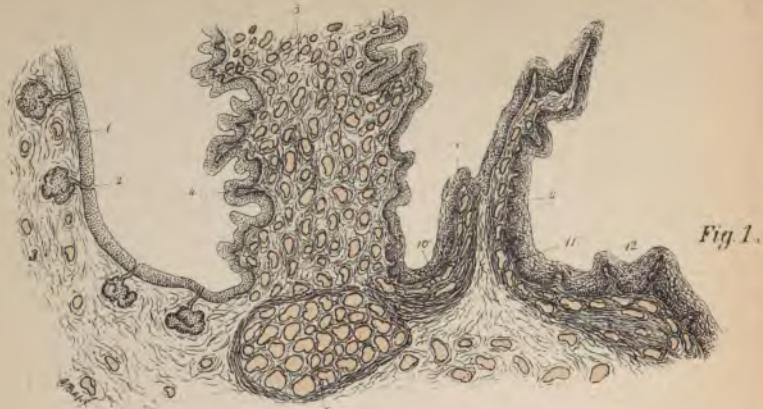
Explanation of Plate 5.

FIG. 1.—Histological structure of the vulva (original drawing from the author's specimen taken from a newly born child). 1, Stratified pavement epithelium, with the efferent ducts (2) of many sebaceous glands of labium majus ; the connective tissue (3) being perforated by scanty blood-vessels. 4, Stratified pavement epithelium, resting on connective-tissue papillæ of the nymphæ (devoid of sebaceous glands in the fœtus). 5, Cavernous connective tissue, rich in blood capillaries, forming a corpus cavernosum (6), surrounded by tense fibrous trabeculæ, which, with the blood-vessels (10), extend to the outer layer of the hymen (8), the epithelium (9) of which is stratified, and the inner layer of which is also composed of fibrous tissue and capillaries, which extend from the vaginal (12) wall (see "Atlas of Obstetrics," § 17).

FIG. 2.—Longitudinal section of a portio vaginalis of a prolapsed uterus (original drawing from the author's specimen at the Munich Clinic for Women). The stratified pavement epithelium of the portio vaginalis is superficially cornified. 3 shows the boundary, displaced into the cervical canal, between the pavement epithelium of the portio vaginalis and the cylindrical epithelium of the cervical canal. This displacement above the external os is due to a slight ectropion of the lips of the os. The blood and lymph stasis in a prolapsed uterus shows itself microscopically in dilated vessels (4). (Comp. Plate 32.)

FIG. 3.—(Original drawing, made by combining the pictures from several preparations.) Simple, papillary, and follicular erosion of the portio vaginalis. At the left is to be seen the intact stratified pavement epithelium of the outer surface of the portio vaginalis. This passes outside of the os into cylindrical epithelium, which, after the desquamation of the pavement epithelium, springs from the cuboidal matrix cells of the latter (simple erosion). Farther to the right are seen papillary prominences (papillary erosion) with cylindrical epithelium. Deeper in the inflamed connective tissue, which is filled with round cells and vessels, lie cystic glands, partly filled with mucus, partly with extravasation—gland follicles (follicular erosion). Above and to the left lie some muscular fibres (see Plates 14–16, 26, 27, and Plate 50, Fig. 1).

5

Explanation of Plate 6.

FIG. 1.—Elephantiasis of the vulva (original drawing from the author's preparation at the Munich Clinic). 1, Stratified pavement epithelium situated upon connective-tissue papillæ. In the connective-tissue stroma (2) are many enlarged lymph capillaries (3) and deposits of round cells—a symptom of proliferation (comp. Plate 3, Fig. 1).

FIG. 2.—Condyloma acuminatum (comp. Plate 3, Fig. 2; original drawing from the author's preparation at the Munich Clinic). Delicate dendritic proliferation of the connective-tissue papillæ of the mucous membrane (2), covered with many layers of a very high pavement epithelium.

FIG. 3.—Vaginal secretion; pavement epithelium of vaginal wall. 1, Polygonal; seen from the side at 6. 2, Red corpuscles. 3, Leucocytes. 4, Oidium albicans. 5, Staphylococci. 7, Bacilli. 8, Infusoria of vagina, trichomonas vaginalis (see "Atlas of Obstetrics," § 17).

FIG. 4.—Cross section of a Nabothian gland, between the cervical and external wall of the portio vaginalis (original drawing from the author's preparation at the Munich Clinic). 1, Simple tall, cylindrical epithelium of the cervical mucosa. 2, Desquamated cylindrical epithelium from enlarged cervical glands (Nabothian ovules). 3, Gland of cervix. 4, Stratified pavement epithelium of the outer surface of the portio vaginalis. (Comp. Plates 12, 14, and 59, Fig. 3.)

6

Tab. 6.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Tab. 7
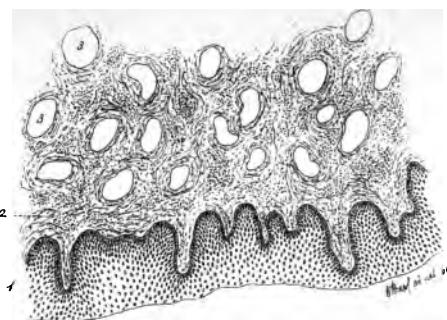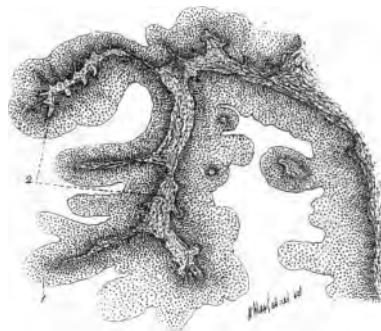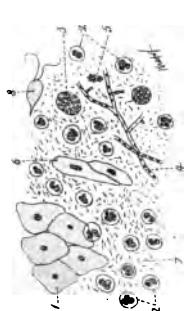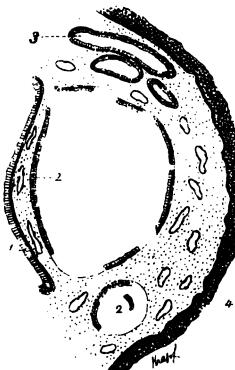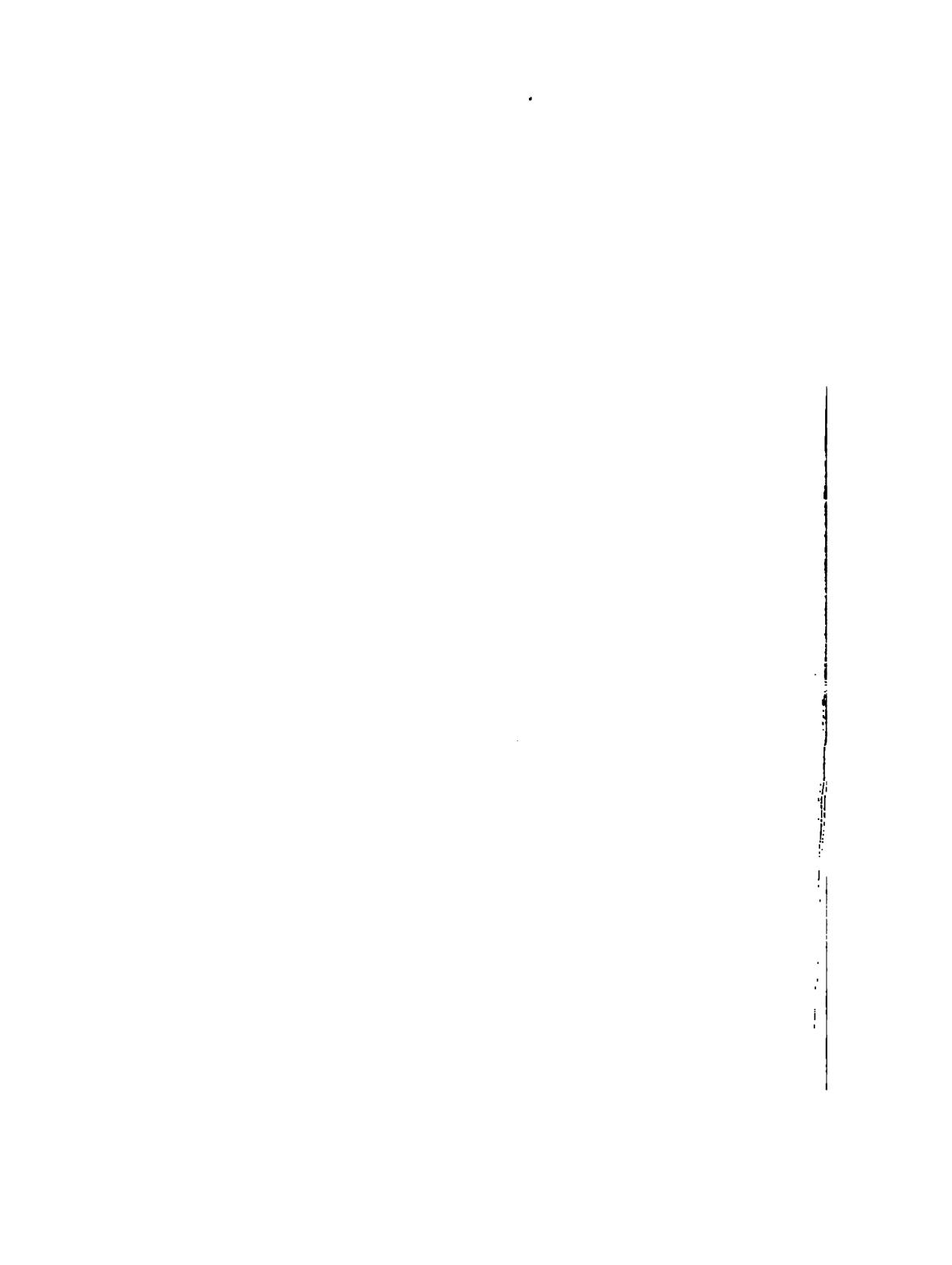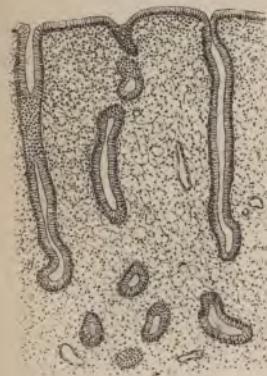
Fig.1.

Fig.2.

Fig.3.

Fig.4.

Explanation of Plate 7.

Fɪɢ. 1.—Normal uterine mucosa (schematic, original drawing). The mucous membrane of the entire uterus is covered with a single layer of cylindrical epithelium. In the cervix the cells are club-shaped and taller than in the corpus. Both are covered with cilia and secrete mucus which rises from the more highly tingible protoplasmic base of the cell, around the nucleus, toward the top, which is covered with a lid and cilia. During this process the nucleus of the utricular cells rises and falls, while the more actively secreting cervical cells possess two distinct parts ; one for production, a club-shaped basal body in which the nucleus remains stationary, and another for conservation, in that part which is joined to the former only by a narrow connection. The latter, therefore, does not take on nuclear stains. The nuclei, therefore, are all at the same level in the cervical, but not so in the utricular cells. The cervical cells are fixed by means of processes which are pushed under the adjoining cells. Cylindrical cells are found in the intact healthy uterus as far as the external os, where the pavement epithelium of the vagina begins.

Anatomically the uterus is divided into two chief parts, the body and the neck ; and correspondingly the utricular and cervical cells show two specific forms of glands ; large acinous glands in the cervix, and long, narrow tubular glands, especially in the corpus, in short utricular glands. They are distributed as follows :

In the body of the uterus there are only utricular glands with low epithelium and a central nucleus; in the cervix, above the plicæ palmatæ, there are both cervical and utricular glands. In the former the cells are of irregular height; in the region of the folds no true glands appear, only rugæ and depressions ; the plicæ are studded with narrow, thread-like papillæ, which are covered with a low, almost cuboid cylindrical epithelium.

In the lowest part of the cervix, acinous and tubular glands again appear together ; furthermore, there is a different kind of papillæ here—flat, with a broad upper part, fungus shaped, and covered with large club-shaped cervical cells.

The secretion of the healthy uterus is small in amount ; the vagina contains no glands, or, at least, only a few in the upper part near the uterus (glandulæ aberrantes) and in the lower part near the vulva. (Comp. "Atlas of Obstetrics, " § 17.)

The mucous and submucous connective-tissue stroma is plentifully supplied with round cells and blood-vessels, which permit of great variations in the thickness of the mucosa, temporarily or at the menstrual periods. This latter fact also explains the rapid power of regeneration possessed by the mucous membrane of this part of the genital tract. External to it is the muscular structure. (Comp. "Atlas of Obstetrics, " § 10.)

Fɪɢ. 2.—Hyperplastic glandular endometritis (original drawing from the author's specimen). The separate glands are enlarged and increased by lateral diverticula (Ruge) ; the walls

7

.

are surrounded by a connective-tissue capsule, much infiltrated with leucocytes and round cells; the stroma is almost free from the inflammatory and proliferative process; when this occurs it is known as endometritis fungosa (Olshausen), and the mucous membrane is greatly thickened; if there is a circumscribed proliferation of glandular and interstitial tissue, we have to deal with an endometritis polyposa.

FIG. 3.—Adenoma malignum (original drawing from the author's specimen). Glandular cancer is differentiated from hyperplastic endometritis in that the glandular and epithelial proliferation is much greater than that of the connective-tissue stroma. Therefore the quantitative relation between the two differs from that in normal tissue. The glandular tissue destroys the stroma and invades the muscular layer until finally it extends into other organs or causes metastasis by means of the lymph channels. The stroma is always greatly infiltrated with round cells and the cavities of the glands themselves give an indication of their rapid proliferation by their investment with several layers of epithelium. The irregularity of the entire appearance and of the glandular forms is very striking.

FIG. 4.—Hypertrophic glandular and interstitial endometritis (original drawing from the author's specimen). The glandular hypertrophic form is seldom found alone and consists in an enlargement (not numerical increase nor marked diverticulation) of the glands (Ruge); this enlargement causes the lumen of the glands to have the shape of a corkscrew, or at the most to cause a slightly jagged bulging of the walls. In this particular preparation the interglandular tissue is also proliferating by round-cell formation, and in this as well as in the glands there are evidences of hemorrhage. The surface epithelium has been cast off here and there.

Explanation of Plate 8.

FIG. 1.—Acute interstitial endometritis (original drawing from the author's specimen). The interglandular connective tissue is rapidly proliferating and consists of thickly packed round cells. The glands are in some places separated and in others crowded together, and again, from the closure of the opening of the glands, there is a formation of retention cysts (ovula Nabothi). Hemorrhages into the stroma. Epithelial desquamation.

FIG. 2.—Chronic interstitial endometritis, developed from the former. The round cells have changed into a dense connective tissue. The glands are obliterated and the vessel walls have become thickened. The superficial epithelium is wanting, or has become very low. On the left-hand side of the figure is shown the pavement epithelium of the external os.

FIG. 3.—Endometritis following abortion. There is an island of decidua cells underneath the superficial epithelium which is not yet regenerated; there are but few glands, many round cells, and greatly dilated capillaries.

8

Tab. 8
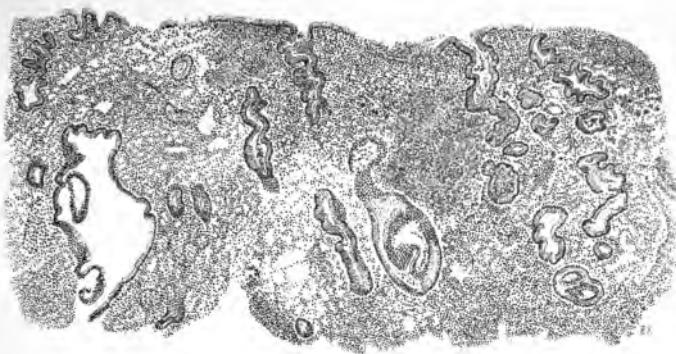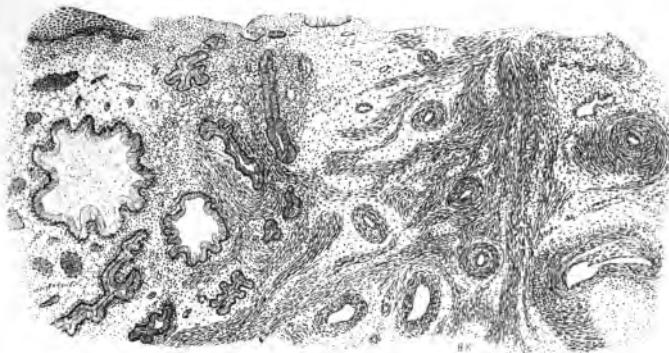
Fig.1.

Fig. 2

Fig.3.
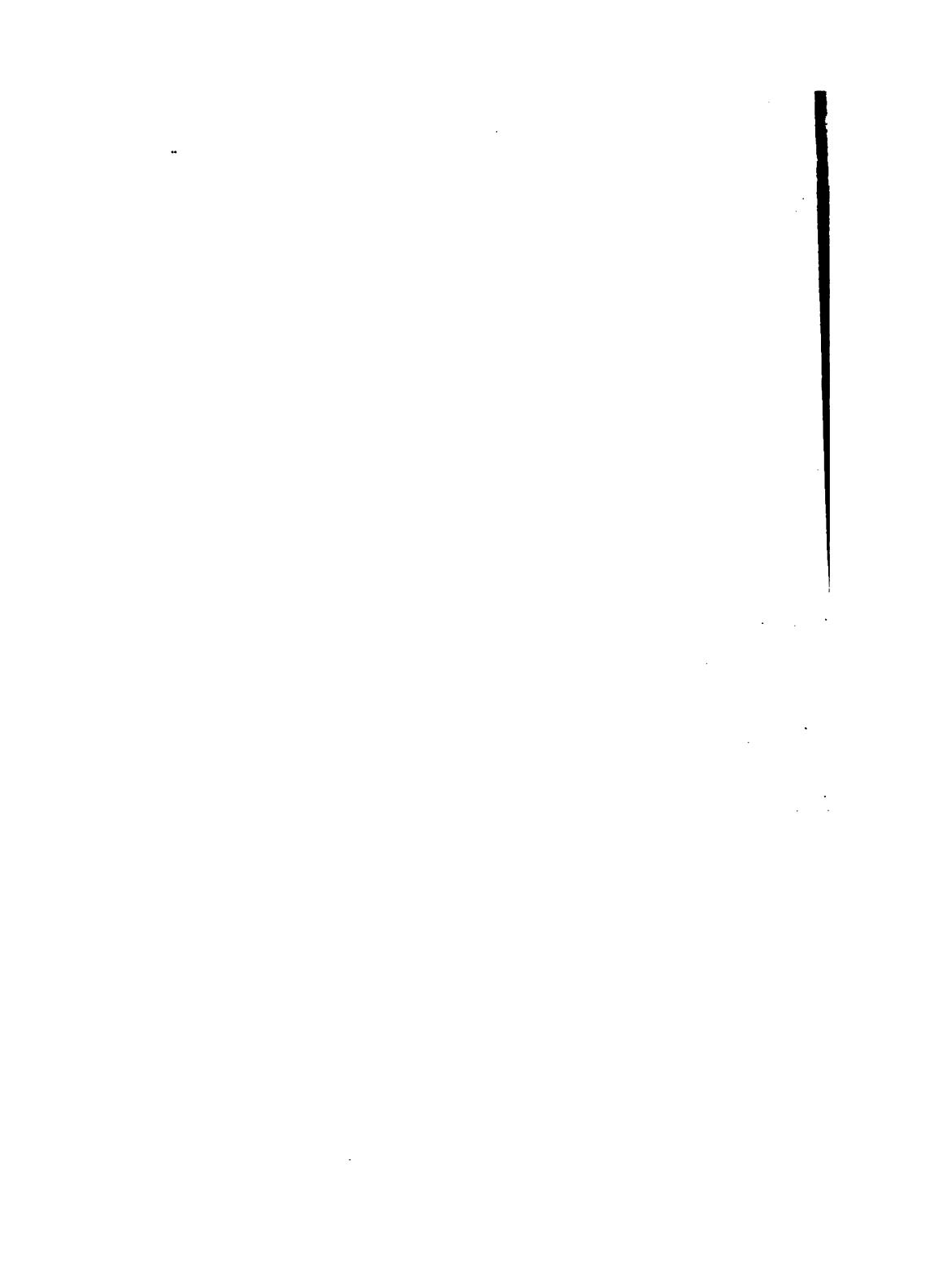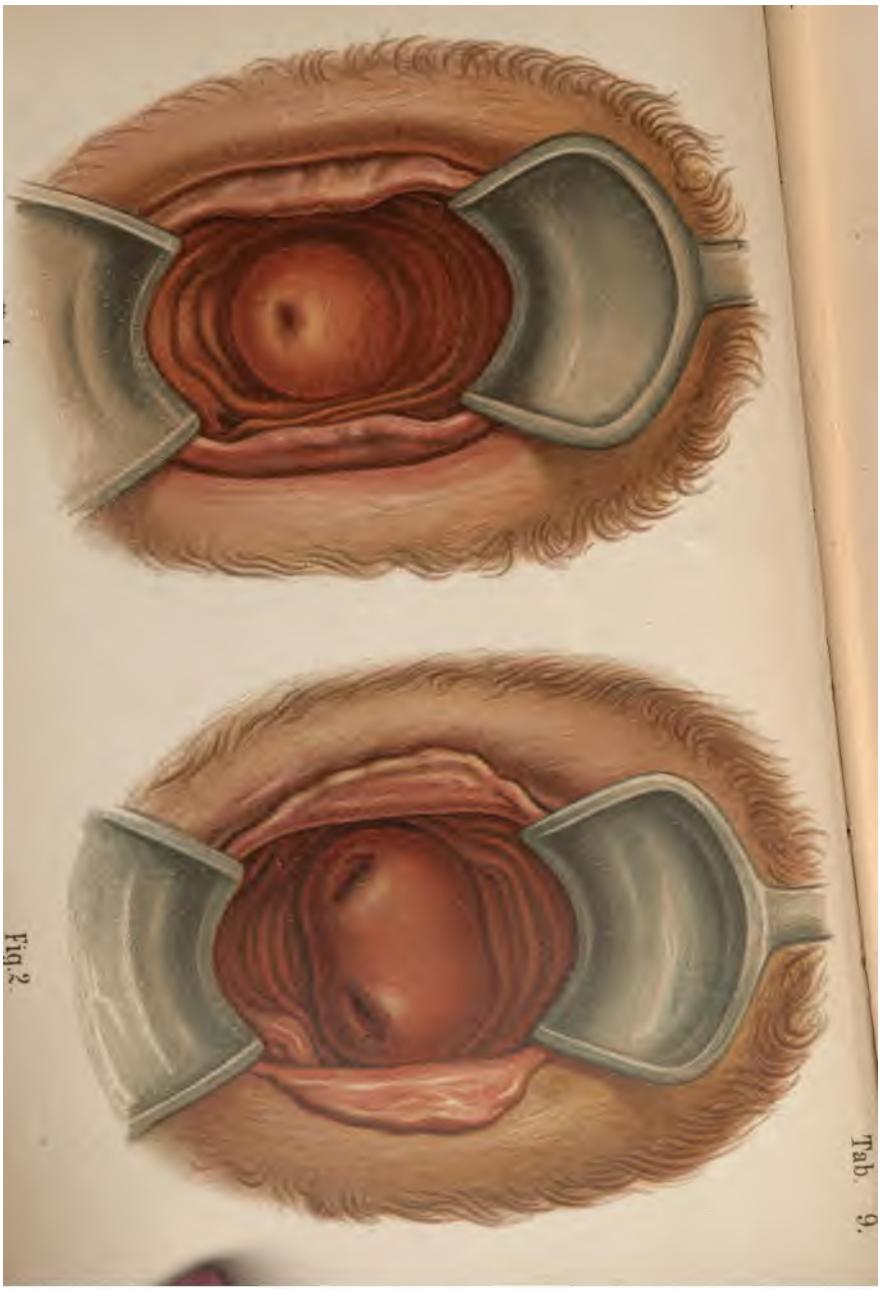
Tab. 9.

Fig. 2

Explanation of Plate 9.

FIG. 1.—Specular appearance of portio vaginalis of an "infantile" uterus. In this and following plates the patient is in the dorsal position. The parts are seen through a Sims' or Simon's grooved or flat metallic speculum. The labia are separated. The vaginal walls are held apart so that in the depth of the rugous funnel the portio vaginalis is seen.

For the general practitioner without assistant the Sims position is the best, for only the posterior blade of the speculum need be used; the anterior wall of the vagina being held back by the position of the patient. The patient lies on the left shoulder and chest, the left arm parallel with the body on the table, and if necessary the hand may hold the speculum. The left thigh is slightly bent, the right strongly flexed on the abdomen; the physician stands behind the patient. The plate shows the pale, small portio vaginalis with narrow, rounded os, of an undeveloped uterus, often combined with congenital stenosis of the cervical canal, and infantile anteflexion (see § 3, 1 to 4, and Fig. 22 in the text).

FIG. 2.—Picture of a double portio vaginalis of a uterus bicornis septus and single vagina. Müller's ducts in the embryo do not lie parallel to the median axis of the body; usually the right is nearer to the abdominal wall. The two orifices show the relative position of the ducts (see Figs. 10–21 in the text, § 2, and "Atlas of Obstetrics," Fig. 99, and § 41). In double uteri sometimes two cervices and two ora may project into the vagina, which is the usual condition in cases of vagina septa. On the other hand, in a uterus subseptus there may be but one external os.

Explanation of Plate 10.

Fig. 1.—View of portio in a case of elevatio uteri. The os uteri does not project into the vagina as it should do, but forms the tip of the vaginal funnel. The oval os is somewhat patulous (§ 6, Appendix).

Fig. 2.—Showing slight hyperæmic congestion of the portio in a multipara, with characteristic broad fissure of the os externum.

Tab. 10.
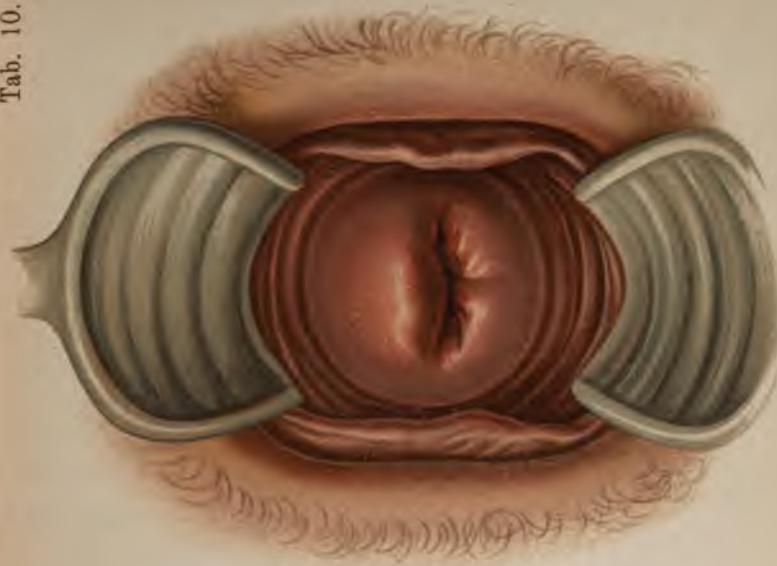
Fig.2.
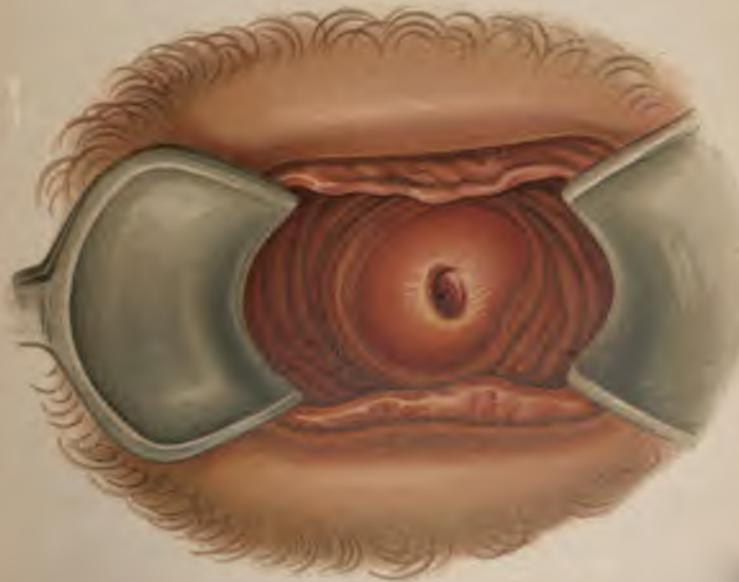
Fig.1.

Fig.1.
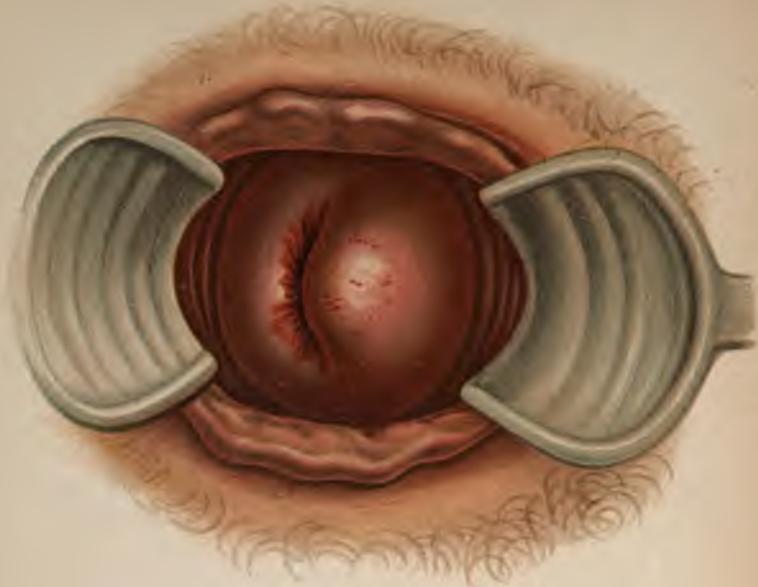
Fig.2.
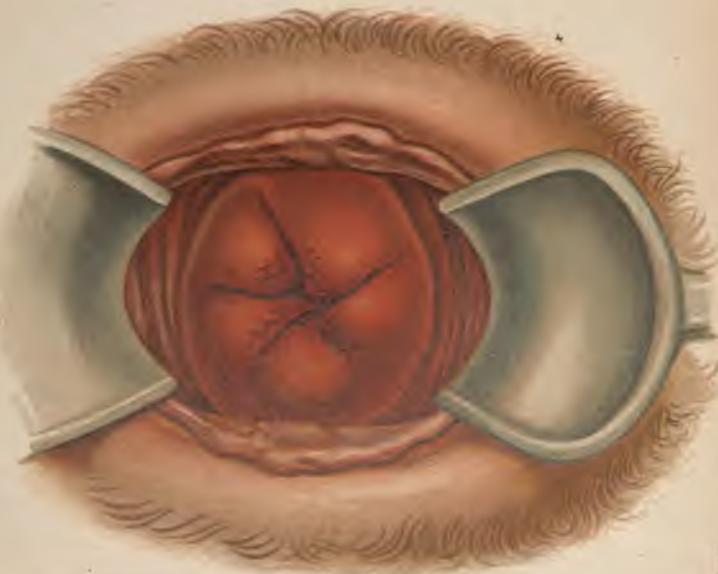
Tab. 11.

Explanation of Plate 11.

FIG. 1.—Marked congestion and commencing simple erosion of the posterior lip of the os, showing inflammation of the uterus itself—endometritis and metritis. The simple erosion (comp. Plate 5, Fig. 3) consists of the exfoliation of the stratified pavement epithelium, leaving the cuboidal matrix layer, through which the capillaries may be seen. The desquamation is caused by the acrid uterine secretion.

FIG. 2.—Stellate laceration of the external os, following difficult parturition due to a rigid cervix or operative procedure before the os is sufficiently dilated. Lacerations of the lips of the os uteri are as often seen as those of the lateral commissures, but while the first heal readily the latter leave deeper scars, on account of deficient blood supply. The result is a gaping of the os and a gradual prolapse of the cervical mucosa (ectropion).

11

Explanation of Plate 12.

Fig. 1.—Extensive ectropion (comp. Plate 59, Fig. 1), showing Nabothian ovules in the swollen cervical mucosa, in a case of laceration of the left uterine commissure. The picture is a more advanced stage of the last. There is catarrhal inflammation of the mucosa (endometritis, cervicitis); glandular degeneration is shown by the retention cysts (see Plates 6, 7, and 8, and Plate 59, Fig. 3).

Fig. 2.—Long-standing ectropion and hyperæmic congestion of the portio. The mucosa is seared by the formation of cicatricial tissue (chronic interstitial endometritis) (see Plate 8, Fig. 2).

12

Tab. 12.
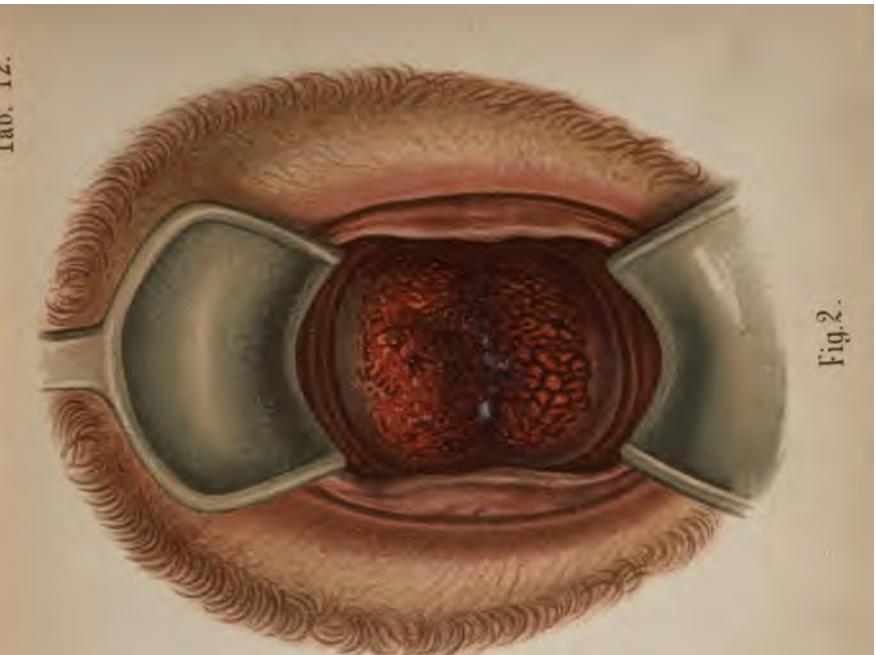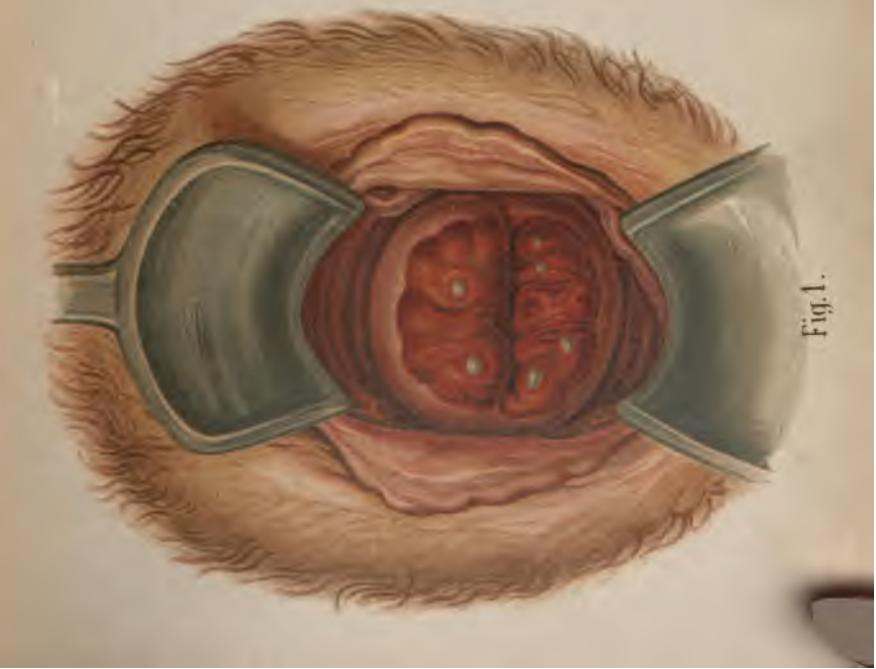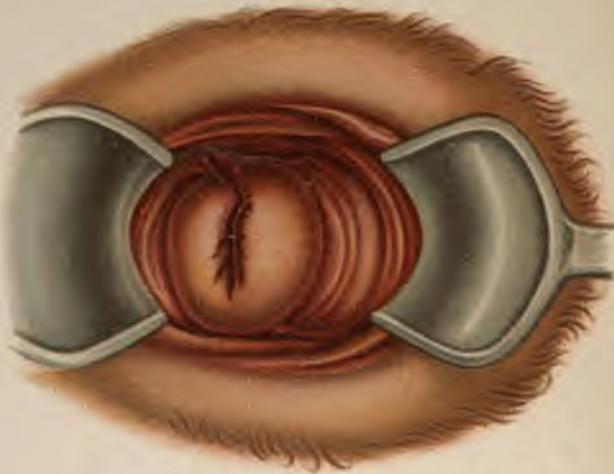
Fig. 2.

Fig. 1.

Fig. 1.

Fig. 2.
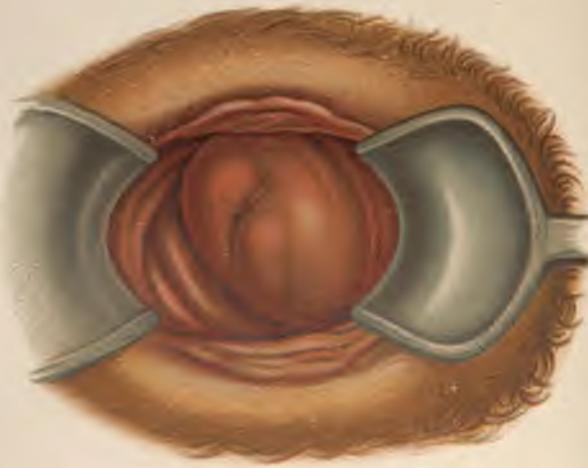
Explanation of Plate 13.

FIG. 1.—Laceration of the right commissure, which has included part of the vaginal vault, as shown by the cicatrix. The portio is pulled slightly backward and fixed; partly on this account and partly owing to inflammatory adhesions higher up, the uterus is anteverted and lies on the anterior fornix.

FIG. 2.—Torsion of the portio backward and to the left in laceration of the left commissure and consequent cicatrix of the left vaginal vault.

Explanation of Plate 14.

FIG. 1.—Follicular erosion (comp. Plate 5, Fig. 3). Some glandular cysts have broken and left small circular crater-like depressions, with reddened margins. There are also simple erosion and indentations of the os uteri.

FIG. 2.—Gonorrhœal endometritis (pus) with simple erosion and ovula Nabothi. Inflammatory hyperæmia (Plates 6, 7, and 8; Plate 59, Fig. 3). Thick, yellow, creamy pus is seen exuding from the os into the vagina. The Nabothian ovules are also filled with pus. The erosion is the result of endometritis (comp. Plate 11, Fig. 1). There is a mixed infection, after a while, with staphylo- or streptococci, in addition to the gonococci, the latter preparing the field for the two former. The process extends to the Fallopian tubes and from there gradually to the adjoining peritoneum, producing perisalpingitis, periooöphoritis, and perimetritis. There are exudation and matting together of the different organs and the formation of false bands (Plates 17 and 20). The gonococcus is mostly found in the superficial layers of the mucous membranes which are covered with simple cylindrical epithelium. The adhesions of the tubes and ovaries cause pyosalpinx (Plate 20) and sterility; the perimetritic process, displacements of the uterus and its adnexa.

Fig. 2.
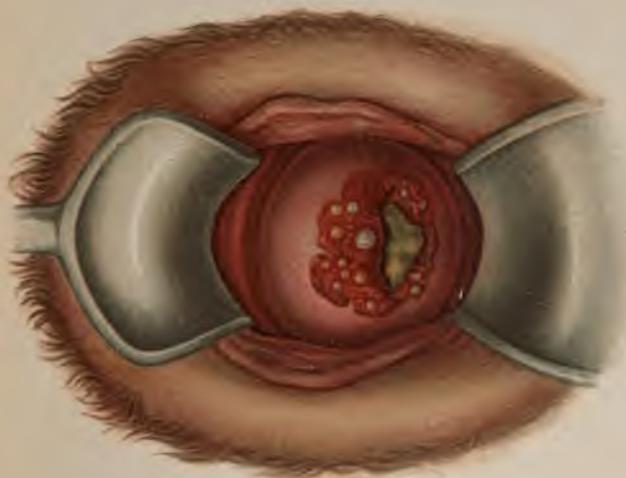
Fig. 1.
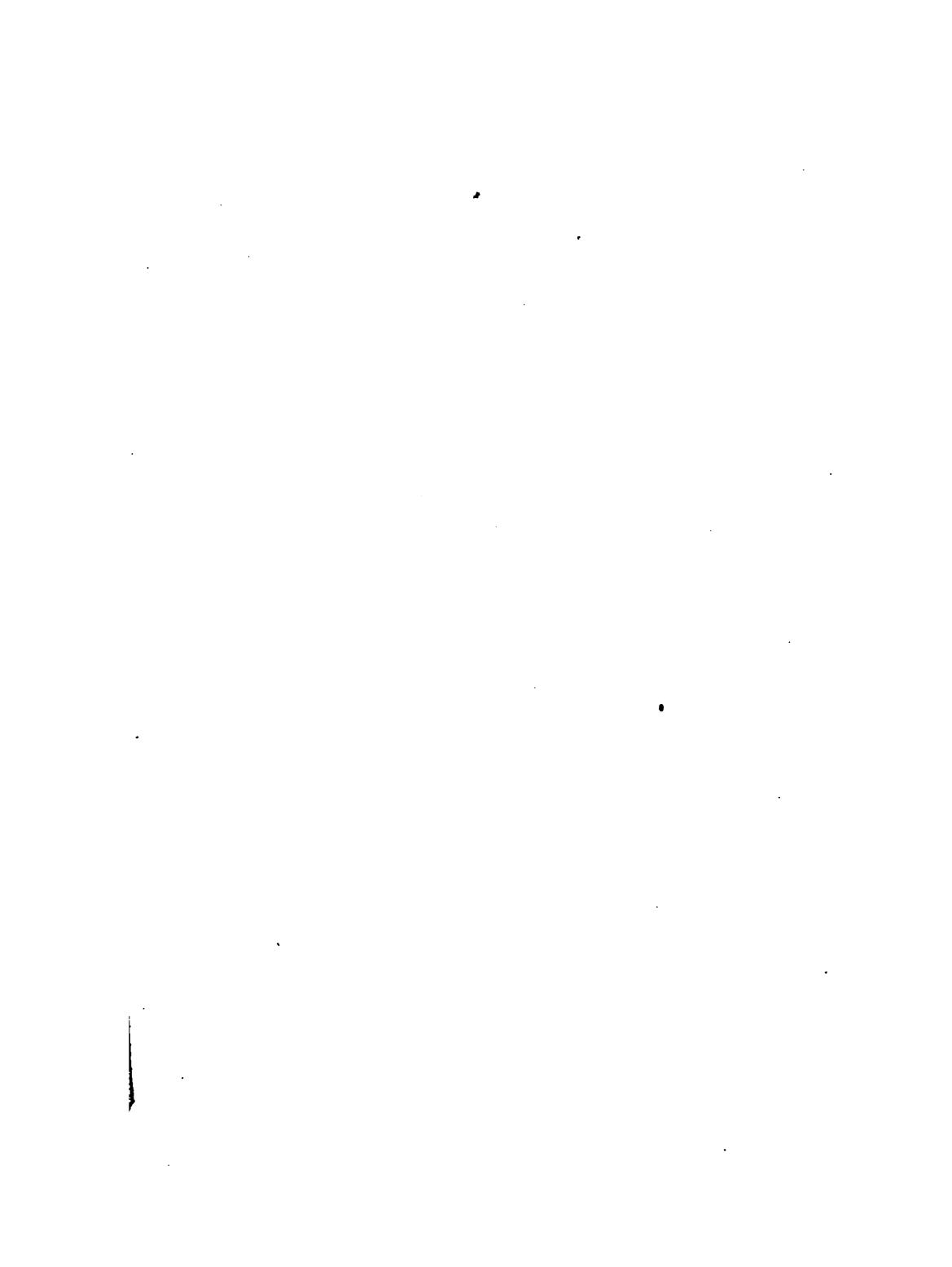
Fig.1.

Fig.2.

Tab. 15.
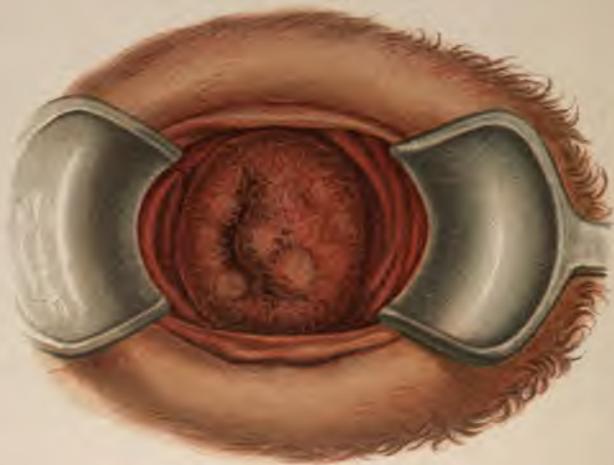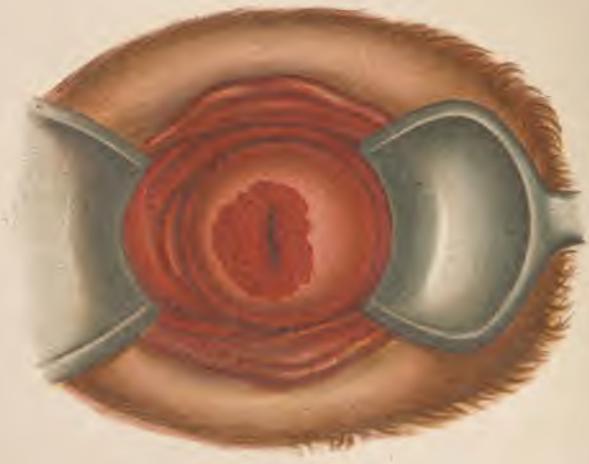
Explanation of Plate 15.

FIG. 1.—Chronic metritis with Nabothian ovules. Metritis is the inflammation of the muscular tissue of the uterus. When it becomes chronic the muscular fibres are in part replaced by cicatricial connective tissue (as in Plate 8, Fig. 2), which in this figure is shown to cause retraction with wrinkling of the mucosa of the portio vaginalis. The ovula Nabothi have become retention cysts through pressure of the new connective tissue on their efferent ducts (see Plate 6, Fig. 4).

FIG. 2.—Simple erosion. The os uteri is intact, but the superficial layers of the pavement epithelium are eroded (see Plate 5, Fig. 3; Plate 11, Fig. 1).

Explanation of Plate 16.

FIG. 1.—Mucous polyps are circumscribed proliferations of the endometrium, *i.e.*, of the mucous membrane. They consist of connective tissue, in which numerous glands, sometimes cystic, and thin-walled hyperæmic capillaries are found (see Plate 46, Fig. 1). They are attached by a pedicle, and bleed easily. Unlike the fibromyomatous polypi, they are soft. The livid congestion comes from the constriction of the os.

FIG. 2.—Simple erosion with Nabothian ovules; a uterine fibroid is beginning to distend the os uteri, *i.e.*, to be delivered. (Comp. Plate 44, Fig. 1; Plate 59, Fig. 1, and "Atlas of Obstetries," Fig. 96.)

Fig.2.

Fig.1.

Tab. 17
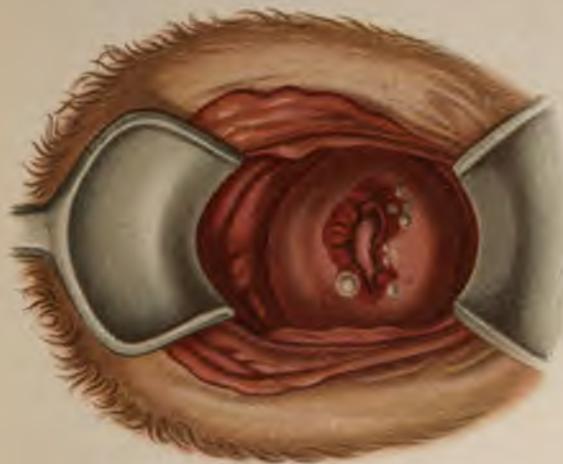
Fig.1.

Fig.2.

Explanation of Plate 17.

FIG. 1.—View from above of the true pelvis in chronic pelvic peritonitis. The uterus is drawn forward and to the left by adhesions. Pseudo-ligaments extend from it to a loop of the intestine and to the bladder, and fix the Fallopian tubes and ovaries. The left ovary is enlarged, in cystic degeneration; that is, the follicles have become cystic from desquamation of the germinal epithelium, and the breaking down of the ovula (comp. Plate 19, Fig. 3). The right ovary is not enlarged and is scarred through frequent ovulation, a characteristic of older persons. The chronic plastic results of inflammation are caused by gonorrheal inflammation of the Fallopian tubes, or by a metritic or parametritic process, which has resulted either from parturition or operative lesions of the mucous membrane of the genital tract, or they are due to inflammation of the other abdominal organs and sink into Douglas' pouch as the lowest cavity.

FIG. 2.—Dermoid cyst (of left side) perforating the rectum (original drawing from a case in the Munich Clinic for Women, made out by palpation). Hair from the tumor extends through the opening into the rectum. Dermoid cysts are found most frequently in the ovaries, and contain hair, teeth, and sebaceous glands. They may contain, however, complicated organic structures, such as brain and nerve matter, parts of the eye, lower jaws with teeth, etc. (comp. Plate 45, Fig. 4).

Explanation of Plate 18.

FIG. 1.—Acute catarrhal parenchymatous salpingitis, gonorrhœal and streptococcal inflammation (original drawing from the author's specimen). The tubal catarrh shows itself by hypersecretion of mucus—the first symptom of the invasion of cocci. The connective-tissue papillæ (1) covered with ciliated cylindrical epithelium throw out branching growths which fill the lumen of the tubes (2). The stroma of the papillæ is dotted with young cells (6). The submucosa (4) and the muscularis (5) are still normal, only a round-cell proliferation is beginning about the blood-vessels (3).

The diagnosis is to be made between (1) acute catarrhal parenchymatous salpingitis with a proliferating, well-preserved epithelium; (2) acute parenchymatous and purulent interstitial salpingitis with partly desquamated epithelium and infiltrated stroma; (3) chronic interstitial salpingitis, atrophy from connective-tissue formation in the muscular coat. The tubes lose their elasticity. Form 1 results in hydrosalpinx from closing of the openings of the tubes. Forms 2 and 3 cause hæmato- and pyosalpinx.

FIG. 2.—Hæmatosalpinx (original drawing from the author's specimen). The menstrual flow remains in the uterus owing to atresia (see Figs. 7–11 in the text), and finally reaches the tubes, distending them (2). The epithelium (1) of the papillæ (3) is flattened from pressure and desquamated. The blood-vessels (5) of the submucosa (4) are distended by stasis, and in the muscular coat (6) round cells collect about the blood-vessels (7). Hemorrhage into the tubes occurs from menstruation, from heart or kidney trouble, myoma, ovarian cysts, extra-uterine gestation, etc.

18
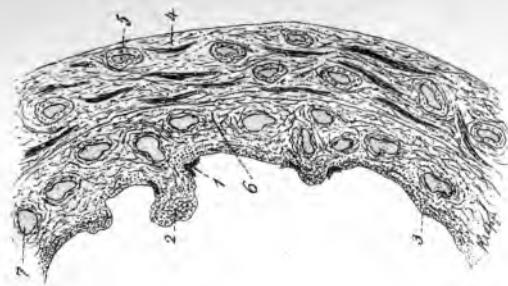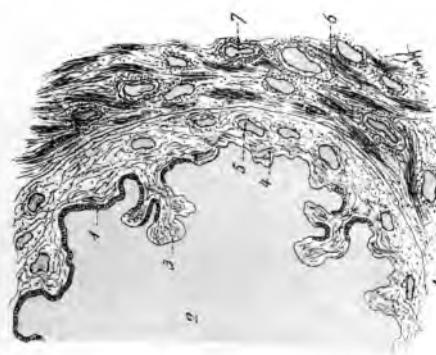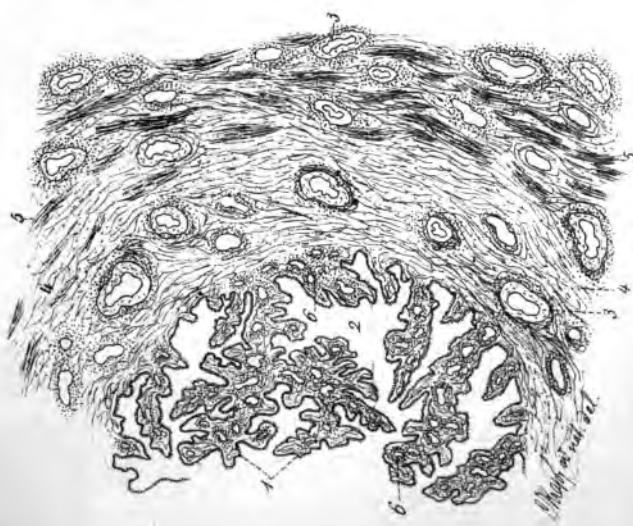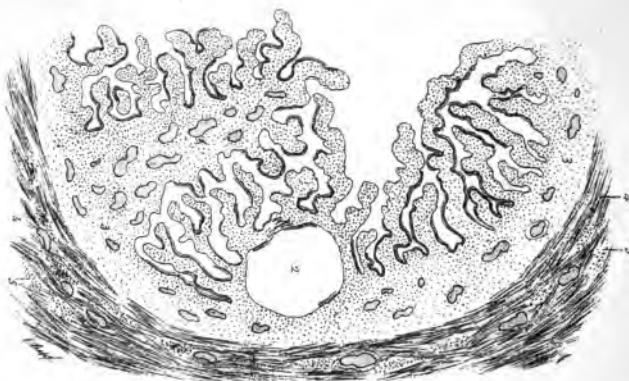
Fig. 1.

Fig. 2.

Fig. 3.

Fig.1.
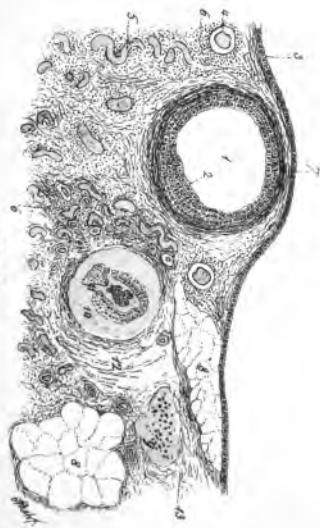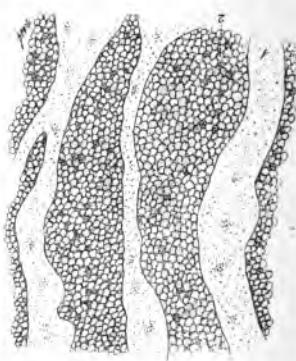
Fig.2.

Fig.3.

FIG. 3.—Pyosalpinx (original drawing from the author's specimen). As the walls of the closed tubes are distended by pus, and more and more involved by the inflammatory connective-tissue proliferation, not only are the papillæ (2) completely flattened after the breaking down of the epithelium (1), so that the stroma (3) containing numerous round cells is distended with pus, but also the elasticity of their walls is lost, because fibrous connective tissue (6) replaces the separated muscular bundles (4). The capillaries of the submucosa are dilated by stasis; the blood-vessels of the muscular coat thickened by chronic inflammation. These pus sacs contain many microbes, and bursting produce, according to their duration, sepsis of varying virulence.

Explanation of Plate 19.

FIG. 1.—Acute purulent parenchymatous and interstitial salpingitis (original drawing from the author's specimen). There is not alone proliferation of the papillæ but round-cell infiltration of the stroma (1), connective tissue of the submucosa (3), and muscular coat (4 and 5). The epithelium is partly swollen and partly desquamated, and the excoriated papillæ have adhered together and formed cysts (2).

FIG. 2.—Acute parametritis of the broad ligament (original drawing from the author's specimen). Both the connective and the adipose tissue are infiltrated with round cells. This first stage of swelling and suppuration changes in the second stage to the transformation into firm cicatricial connective tissue, undergoing contraction later.

FIG. 3.—Chronic oöphoritis and oligocystic degenera-

tion (comp. Plate 17; original drawing from the author's specimen). The inflammatory process, beginning with round-cell infiltration in the stroma, causes sclerotic formation, which, by thickening of the tunica albuginea, in turn leads to cystic swelling of the follicles (1 and 2); their epithelium (10) is cast off, and the ovula break down. The old corpora lutea change into corpora fibrosa (8). In the stroma are recent and old hemorrhages or coloring matter of the blood (9). The undulating course (5) of the vessels (4) is characteristic of the ovaries. In places these are surrounded with round cells (6). The follicles are surrounded by the tunica fibrosa (7). The surface of the ovary is covered with cuboidal germinal epithelium (3).

Explanation of Plate 20.

Pelvic peritonitis, perioöphoritis, perisalpingitis, and right pyosalpinx (Douglas' sac seen from behind; original drawing). The uterus is fixed by adhesions to all its adnexa and to the sigmoid flexure. The left tube is bent, the right inflamed and changed into a pyosalpinx from closure of the mouth of the tubes. The bullet-shaped divisions of the tumor are characteristic (comp. Plates 17 and 18, Fig. 3).

Tab. 20.

Tab. 2
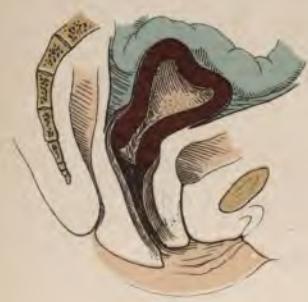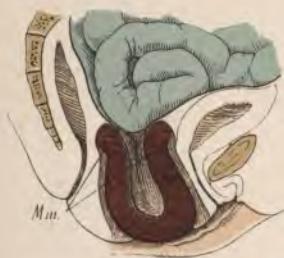
Fig.1.

Fig.2.

Fig.3.

Fig.4.

Explanation of Plate 21.

FIG. 1.—Impressio fundi uteri; beginning inversion, follow-ing the practice of Credé's manipulation in a relaxed uterus (original schematic drawing).

FIG. 2.—Partial inversion. Part of the cervix has not yet become inverted. The peritoneum, with the ovaries and tubes, has sunk into the inverted uterus (original schematic drawing).

FIG. 3.—Complete inversion. The os has not descended (origi-nal schematic drawing).

FIG. 4.—The completely inverted uterus has fallen through the vulva; the upper part of the vagina has prolapsed as far as the constrictor vaginæ, and the levator ani is also inverted (origi-nal schematic drawing).

Explanation of Plate 22.

FIG. 1.—Inversion of the uterus as far as the os externum (comp. Plate 25, Fig. 2; original schematic drawing). A poly-poid myoma of the fundus has caused the formation of a peri-toneal pocket (comp. figure of myoma in text).

FIG. 2.—Complete prolapse of the retroflexed uterus and vagina through defect of perineum; cystocele (comp. Plate 27, Fig. 1; Plates 28 and 30). (Original schematic drawing.) The vertex of the bladder lies against the fundus of the uterus. The bladder diverticulum reaches as far as the os internum. Douglas' sac contains no intestinal coil, as happily is often the case. It is here prevented by the body of the retroflexed uterus. The os externum shows ectropion; the cervix is swollen.

This picture represents the extreme possibility of prolapse as well as the most common mode of origin. It occurs as follows:

Either through rupture of the perineum (Plate 64), or weak-ness of the pelvic floor and of the contrictor vaginæ and levator ani muscles the anterior vaginal wall loses its normal support (comp. Plate 25). Next the vaginal tubercle descends and lies between the nymphæ; then the upper part of the vagina not only begins to descend, but to invert itself into the vulva, as straining efforts will show. The vaginal portion of the uterus, which is still normally anteverted, is drawn down and forward, following the falling of the upper vaginal wall (Plate 64, Figs.

21

2 and 3). Then the lower half of the posterior vaginal wall begins to descend, pulls down the posterior fornix, and thus also exerts traction on the uterus from behind (Plate 64, Fig. 4). The uterus assumes first the vertical and then the retroverted position, *i.e.*, the long axis of the uterus and vagina correspond. The long axis of the vagina is now more vertical than normal (comp. Plate 31, Fig. 1) ; it has lost its support (comp. Plates 23, 29, 33, Fig. 2). The result is that the slightest sudden pressure or other movement will cause a descent and protrusion of the uterus (comp. Plate 26, Fig. 2). This pressure from above also causes a bending of the body on the neck—retroflexion. The bladder and peritoneal sacs remain as in Fig. 2.

If the prolapse is complete, the pressure continues until the mucous membrane of the uterus is pushed outward ; ectropion, erosion, and ulceration follow (comp. Plate 26, Fig. 1 ; Plates 27, 28, and 30). Disturbances of the circulation cause lividity and swelling of the portio (comp. Plate 5, Fig. 2 ; Plates 28 and 32). The congestion leads finally to inflammatory changes and hypertrophy, also to polyps of the mucous membrane, and enlargement and lengthening of the cervix (comp. Plates 28 and 32 with 23 and 24, also with Fig. 23 in the text). The body of the uterus is not usually involved, though the surface epithelium becomes cornified. The vaginal wall becomes thickened in its muscular coat ; the adipose tissue diminishes.

FIG. 3.—Prolapse of the posterior vagina ; rectocele ; descensus of the retroflexed uterus, second degree (original schematic drawing). The posterior vaginal wall is less often first inverted. In the pocket may be a diverticulum of the rectum ; the connection with the vaginal wall, however, is much looser than between the bladder and vagina. Determined by digital exploration.

FIG. 4.—Anterior prolapse of the vagina. Extreme degree of cystocele. Anteflexion of uterus, first degree. Descent. (Original schematic drawing). (Cystocele is diagnosed by the sound. Comp. Plate 30.)

Tab. 22.

Fig. 2.

Fig. 4.

Fig. 1.

Fig. 3.

Fig.1.

Fig.2.

Fig.3.

Fig.4.

Explanation of Plate 23.

FIG. 1.—Incomplete prolapse of retroverted uterus; inversion of vagina; incipient rectocele. A slight bladder diverticulum has formed (comp. Plate 26, Fig. 2). (Original schematic drawing.)

FIG. 2.—Incomplete prolapse of retroverted uterus; extensive rectocele; inversion of vagina (original schematic drawing).

FIG. 3.—Complete prolapse of the anteflexed uterus (first degree) and vaginal wall, with cystocele. Characteristic bending of urethra (comp. Plate 30). (Original schematic drawing.)

FIG. 4.—Complete prolapse of retroflexed uterus (first degree) and vagina; slight diverticulum of rectum and bladder (original schematic drawing).

Fig. 1.

Fig. 2.

Tab. 25.

the organ is anteflexed, and has included in the bend a piece of the wall of the bladder. There is an elongation of the cervix. The case had been better treated by an amputation.

FIG. 4.—Hypertrophy of the anterior lip of the os (original schematic drawing, altered from Schröder), causing inversion of the anterior wall of the vagina and cystocele.

Explanation of Plate 25.

FIG. 1.—Inversion of the vagina, due to rupture of the perineum (third degree, extending through the sphincter). The tubercle of the vagina is descended (Original water color.)

FIG. 2.—Complete inversion of the uterus due to a myoma of the fundus (comp. Plate 22, Fig. 1; original water color).

Explanation of Plate 26.

FIG. 1.—Complete prolapse of anteflexed uterus. Simple erosion (com. Plate 5, Fig. 3; original water color).

FIG. 2.—Partial prolapse; inversion of vagina owing to rupture of perineum (third degree, extending through the sphincter). The os is notched. (Original water color. For prolapse in general see Plate 22, Fig. 2.)

Tab. 26.

Fig 2.

Fig.1.

Explanation of Plate 28.

Partial prolapse; simple erosion. The portio is thickened by engorgement. Rectocele (original water color from a case in the Heidelberg Clinic for Women).

Tab. 28.

Tab. 29.
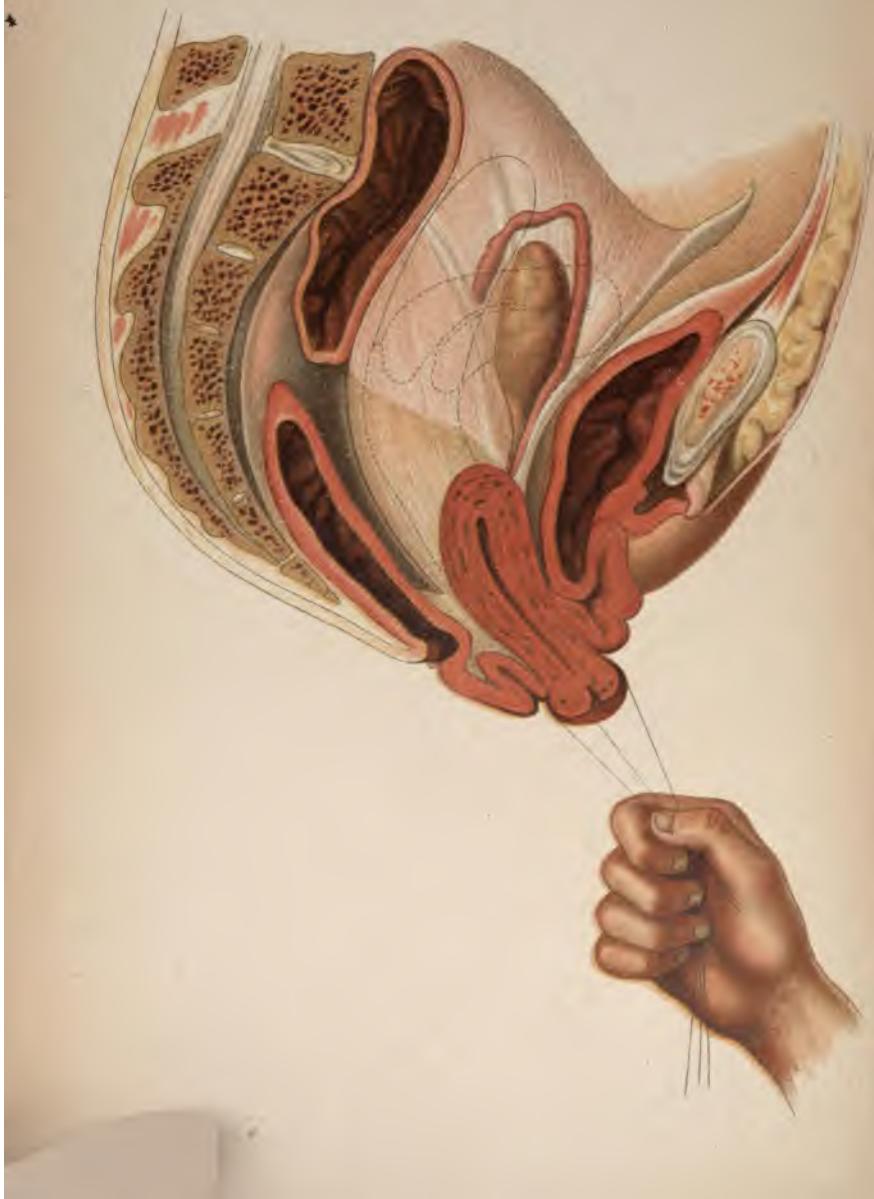
Explanation of Plate 29.

Prolapse produced for operation; inversion of vagina and cystocele. The uterus, first, is somewhat retroverted, and the further pull brings it downward directly along the axis of the vagina—compare the dotted lines, which mark the original position, with the artificially produced one. Pathological prolapse takes place in exactly the same way (original schematic drawing; copied in part from an illustration by Beigel).

Explanation of Plate 30.

Complete prolapse; cystocele; observe the introduction of the sound and its direction. The position of the hand as in holding a pen (original sketch).

Tab. 30.
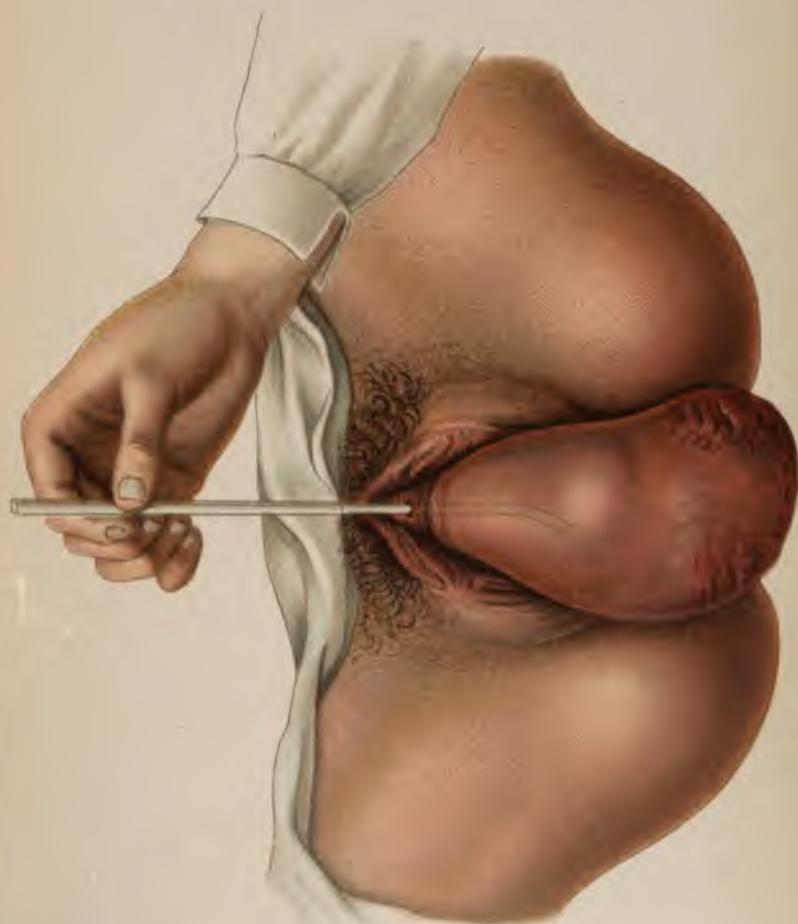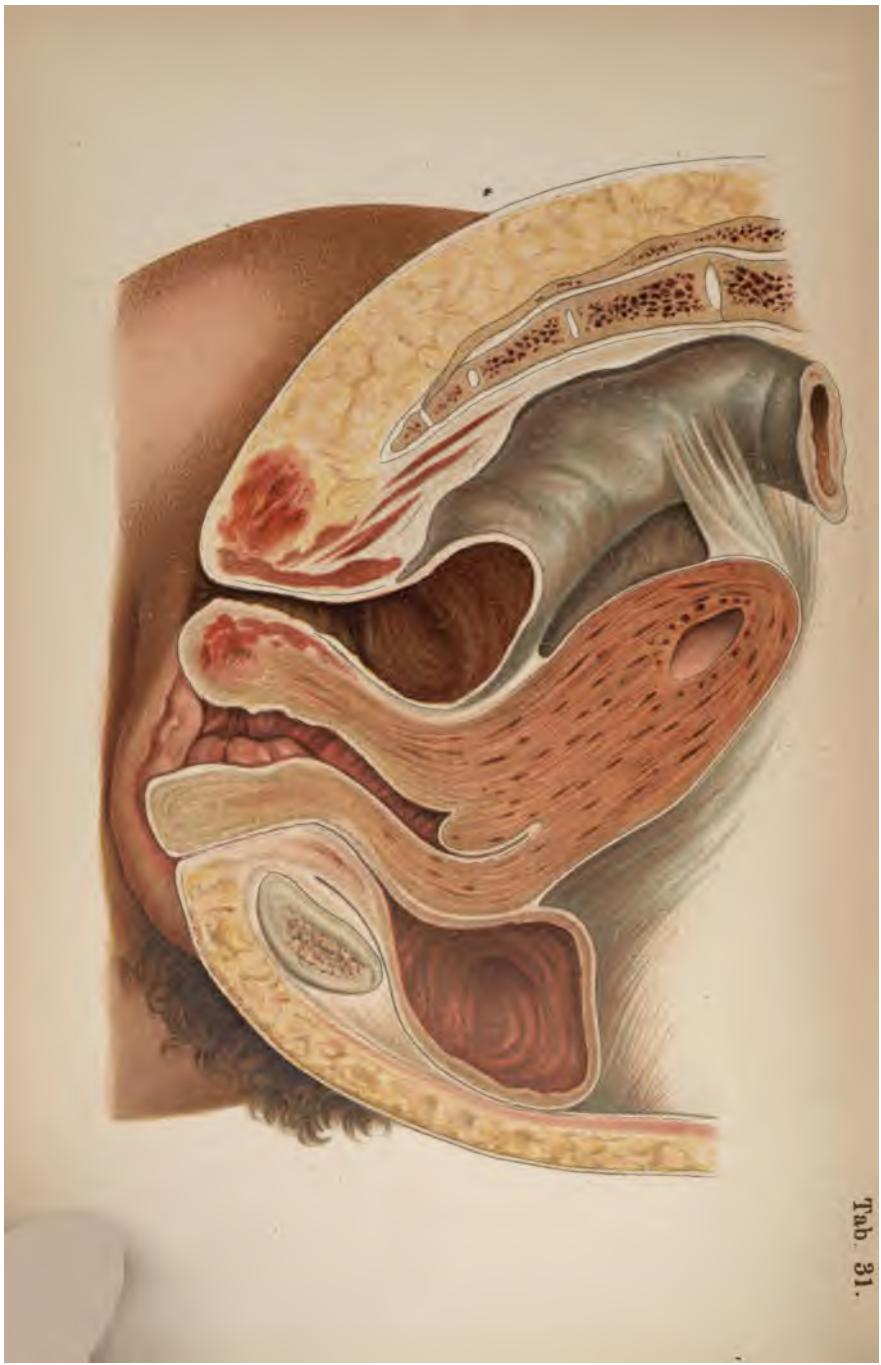
Tab. 31.

Explanation of Plate 31.

Fixed retroversion (first degree), with acquired atresia of the cervix. A peritoneal adhesion holds the fundus fixed in retroversion. Cauterization or senile degeneration causes agglutiantion and subsequent atresia of the cervix. The direction of the vagina is altered in retroversion of the uterus (original water color from a specimen in the Munich Clinic for Women).

Explanation of Plate 32.

Partial prolapse. Elongation of the intermediate por-
tion of the cervix, and circular hypertrophy of the portio
vaginalis. Inversion of the anterior vaginal wall; cys-
tocele; the posterior vaginal vault is in almost normal
position (comp. Plate 24, Fig. 1; original water color
from a specimen at the Munich Clinic for Women).

Tab. 32.
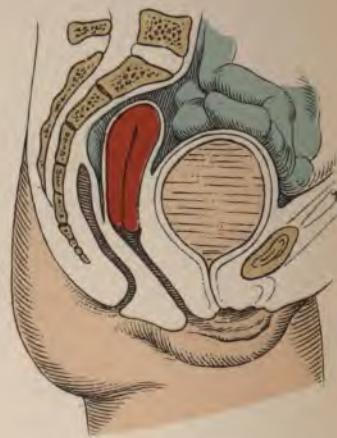
Fig.1.

Fig.2.

Fig.3.

Fig.4.

Explanation of Plate 33.

Fig. 1.—Encapsulated peritoneal exudation in Douglas' sac; descent and fixed anteposition of the uterus (flexed and curved vaginal canal). The same peritonitic processes which we have seen in Plates 17 and 20, and perhaps such as are due to descent of other abdominal organs, have caused this collection of an exudate in the retro-uterine cavity; the overlying intestines, bound together by adhesions, form a covering capsule for this pseudo-tumor. The uterus is fixed in its entire length to the bladder by adhesions (original schematic drawing).

Fig. 2.—Retroposition of the uterus caused by distention of the bladder; the uterus, through its connection with the bladder, is lifted up at the same time and the vagina is stretched. The uterus is straightened, and vertically above the vagina, the long axes of both organs corresponding. This position, and the habit of young persons to neglect emptying their bladder, tends to produce prolapse (original schematic drawing).

Fig. 3.—First degree of descent and retroflexion of the uterus, brought on by relaxation of Douglas' folds, recognizable by the low position of the vertical portio and the tortuous vagina. The symptoms represent relaxation of the genital organs and their supports (the ligaments and the pelvic floor) as predisposing factors to prolapse (original schematic drawing).

Fig. 4.—First degree of retroflexion of uterus; the cervix is in normal position. The condition is caused by parametric adhesions to the bladder (see § 11). Pressure of the intestines, weakness of the uterine wall, and dorsal position as in the puerperium, combine to force back the body of the uterus (original schematic drawing).

33

Explanation of Plate 34.

Fig. 1.—Second degree of anteflexion. The cervix and fundus are on the same level. The uterus is fixed behind by perimetritic adhesions, or parametritic contracting bands of Douglas' folds; gaping of os externum; pressure on bladder. Adhesions in this position cause obstinate constipation (see § 10 of text; original schematic drawing).

Fig. 2.—First degree of anteflexion (exceptional form). The cervix lies horizontally, fixed by adhesions to the bladder in such a way that a diverticulum of the latter is formed opposite os internum. The body of the uterus is vertical, the os points upward and forward; the vaginal fornix is dragged forward, so that the vaginal axis is vertical (original schematic drawing).

Fig. 3.—Anteflexed "infantile" uterus; stenosis of the cervix and dysmenorrhœa due to congestion (see § 3, Nos. 3 and 4, text; original schematic drawing).

Fig. 4.—Third degree of anteflexion (the fundus is lower than the cervix), dragged down by a submucous polypus (fibromyoma) (original schematic drawing).

34

Tab. 34.

Fig.1.

Fig.2.

Fig.3.

Fig.4.

Tab. 35.
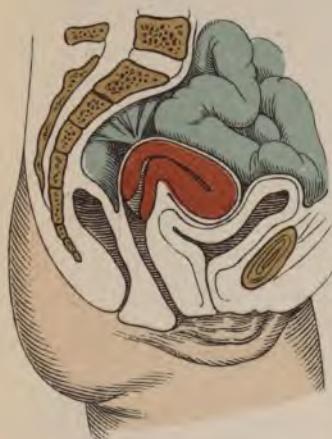
Fig.1.

Fig.2.

Fig.3.

Fig.4.

Explanation of Plate 35.

FIG. 1.—Anteversion; normal position, with bladder empty, when there are no adhesions; normal vaginal canal (original schematic drawing).

FIG. 2.—Anteversion; pathological, since the fundus lies lower than the cervix. The os points upward and backward, the cervix is lifted, the bladder compressed. The usual, associated causes of this condition are: 1, chronic metritis, with parenchymatous changes; 2, perimetritis or parametritis, resulting in either fixation of the cervix behind or of the body in front. As the result of chronic inflammation the organ is stiff and incapable of bending (original schematic drawing).

FIG. 3.—Intramural myoma of the anterior wall of the uterus; anteflexion, second to third degrees (examination with the sound prevents a mistaken diagnosis), with pressure upon the bladder (original schematic drawing).

FIG. 4.—Anteversion; fixed uterus; reposition by filled bladder, the fixed body being raised by distention of the latter. If the angle of flexion has not become too rigid, the axis of the uterus is straightened (original schematic drawing).

Explanation of Plate 36.

FIG. 1.—Retroversion; fixed uterus (original schematic drawing). The uterus is vertical, not flexed, fixed by sacral and rectal adhesions, or by the cicatricial shortening of the uterine ligaments; the vagina is stretched on account of the elevation. Changes in the ligaments are the chief causes of retroversion; in the presence of parenchymatous inflammation of the uterus and ligaments the retroversion changes readily to retroflexion. The appendages usually lie above and to the side of the uterus, except when they are held by adhesions in Douglas' sac.

FIG. 2.—Retroflexion (first degree, fundus higher than cervix) of fixed uterus; the latter is held along its entire length by adhesions in Douglas' sac. The os is pushed forward; the anterior lip and the anterior cervical wall are somewhat thinned; the posterior lip is hypertrophied; the vaginal wall is convoluted, owing to descent. The intestines are pressing upon the uterus (original schematic drawing).

FIG. 3.—Slight retroflexion and descent of the puerperal uterus, owing to relaxation of the genital organs, dorsal position, pressure of the abdominal organs, hard work, etc. Puerperal metritis is often the cause of sub-involution of the uterus (original schematic drawing).

FIG. 4.—Retroversion, third degree; the fundus lower than the cervix, due to pressure of an ovarian tumor. The os points upward and forward. The vagina is vertical and stretched; there is pressure upon the rectum (original schematic drawing).

Tab. 36.

Fig.1.

Fig.2.

Fig.3.

Fig.4.

.

Tab. 37.
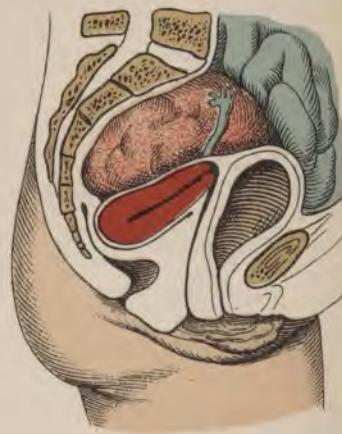
Fig.1.

Fig.2.

Fig.3.

Fig.4.

Explanation of Plate 37.

Fig. 1.—Retroversion, due to two intramural tumors of the body; simulating, on palpation, a retroflexion of the second degree. By passing the sound the true condition is determined. The os points forward; the rectum is compressed with resulting constipation; Douglas' sac is filled, and difficult urination is present (original schematic drawing).

Fig. 2.—Transition from retroversion to retroflexion, owing to an intramural myoma of the anterior wall of the body (original schematic drawing).

Fig. 3.—Retroflexion, third degree; the fundus and cervix are on the same level; falling shown by convoluted vagina; the os is lower than interspinous line. Pressure upon the rectum; the os points forward. The body of the uterus fills Douglas' sac. Hypertrophy of the posterior wall and lip, thinning of the anterior (original schematic drawing).

Fig. 4.—Retroflexion, third degree; the fundus is lower than the cervix (inveterate case); the os gapes widely (ectropion) and points forward; the anterior cervical wall and lip are thinned. The cervix is elevated and the vagina is stretched and vertical. Douglas' sac is occupied by the uterus (original schematic drawing).

Explanation of Plates 38 and 39.

Manual reposition of retroflexed uterus, of the first and second degrees. First movement. The body of the uterus is palpated from the posterior vaginal fornix with the index and middle fingers. Second movement. While the organ is pushed upward by these two fingers, the abdominal wall is slowly pressed in with the other hand until the uterus itself is felt, and the pressure is continued along its posterior surface into Douglas' sac until (third movement) the fingers of the two hands meet. The upper and outside hand will then hold the organ in position, and the inner hand can be removed from the posterior vaginal fornix, so as to (fourth movement) press upward the portio, while the outside hand can bring the fundus against the bladder, and the uterus itself into its normal place and position.

The uterus in its normal position lies in the true pelvis anteverted, with its anterior wall obliquely against the bladder, and the posterior, more convex wall parallel with the upper curvature of the sacrum, so that its long axis runs from above forward to below backward; in other words, the fundus uteri lies in the middle of the conjugata vera, the external os in the interspinous line (comp. Plate 40, Fig. 1), and nearer to the sacrum than to the symphysis.

This position and level of the uterus are not, however, constant. The uterus moves readily, each inspiration presses the organ down; it sinks still farther in the upright position, at least the fundus does, the portio being slightly raised; it is balanced, therefore, upon an axis running through the os internum. This part of the cervix is held in position partly by the supravaginal connective tissue and the fornix of the vagina, partly by the sacro-uterine ligaments, and is suspended from the sacrum by the retractors of the cervix (see "Atlas of Obstetrics," Figs. 30, 31, 34, and §§ 8, 15, and 35). The fundus of the uterus also sinks toward the spine in the dorsal position, the portio approaching the symphysis. The position is also dependent upon the distention of the bladder and rectum (see §§ 10 and 11, Plate 33, Fig. 2; Plate 35, Figs. 1 and 4).

The uterus, however, is not actually suspended by these connections; they serve only to limit the extent of its excursions; in reality it rests upon the floor of the pelvis in such a way that

38

Tab. 38.
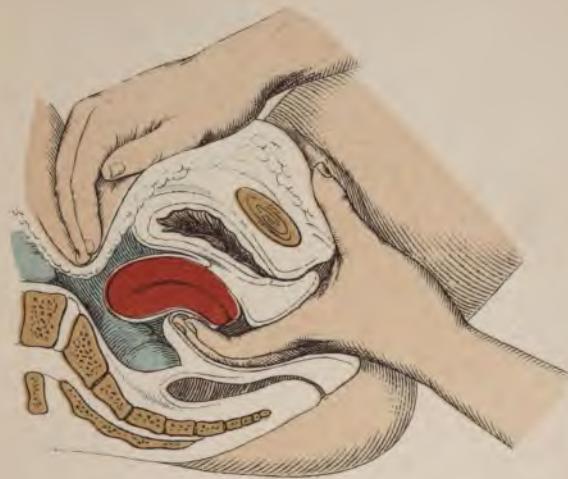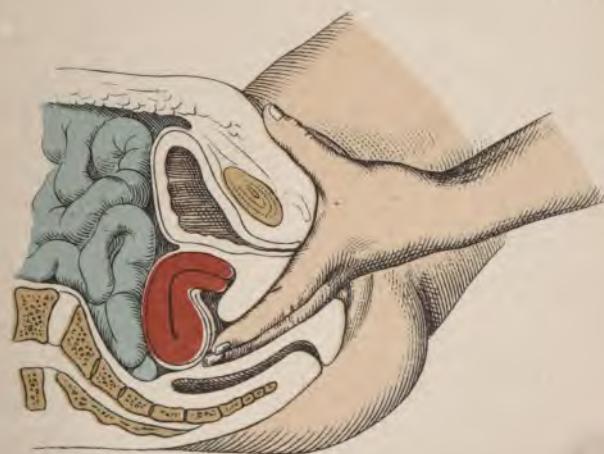
Fig. 2.

Fig. 1.

Fig. 1.
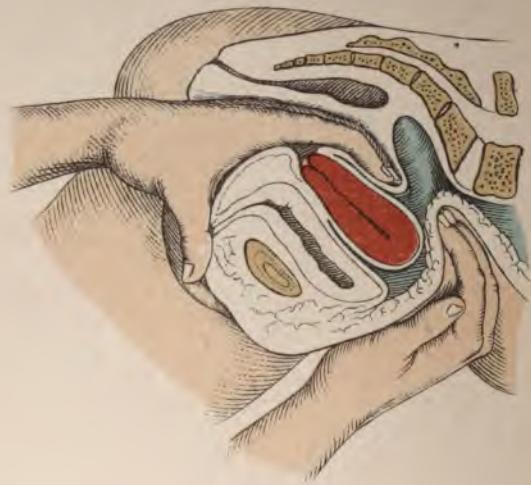
Fig. 2.
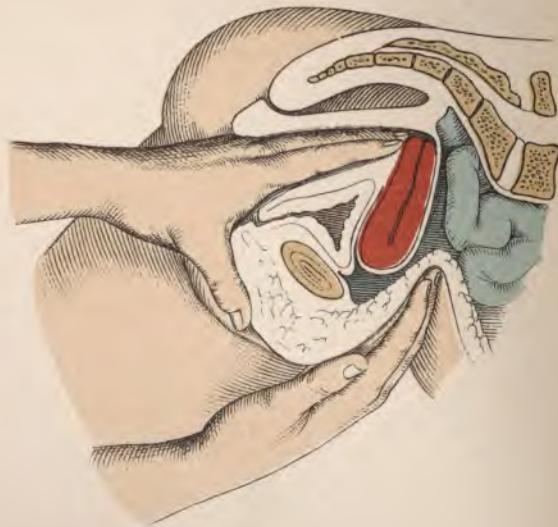
the portio lies against the posterior vaginal wall, while the cervix is surrounded by the vaginal fornices and the paracervical connective tissue. The fornices, however, are held partly by the ligaments (shown in Fig. 34, "Atlas of Obstetrics"), but more especially by means of the vaginal walls themselves, while these latter are held in their position by the pelvic floor, that is, through the constrictor vaginæ and levator ani muscles, and by the rectum. The anterior vaginal wall is supported above by the posterior wall and below by the perineum, while the posterior wall, in its turn is entirely supported by the perineum. The integrity of the perineum largely prevents the descent of the interior genital organ, but this is also dependent somewhat upon the strength of the ligaments. It should be borne in mind that the normal supports cannot bear too great a pressure from above (tumors) or pull from below. The pressure of the air against the open vagina gives also a certain aid to the supporting tissues (knee-elbow position with introduction of Sims' speculum, "Atlas of Obstetrics," Fig. 32, b). The round ligaments have but little effect—they resemble loose reins.

The size of the uterus also influences these relations (tumors, pregnancy, etc.). As to its normal size, form, and structure, see "Atlas of Obstetrics," §§ 9, 10, 13 to 17, and Figs. 28, 30, 31, 33 to 51).

In its normal position Douglas' sac lies 7 cm. above the anus; the vesico-uterine excavation, 7½ cm. above the orifice of the urethra.

The length of the uterus, measured from without, is in virgins from 6 to 8 cm., weight 40 gm.; in women, 8 to 10 cm., weight 100 gm.; the breadth of the fundus in virgins is 4 to 5 cm., in women 5½ to 6½ cm.; of the cervix, 2 to 2½ cm.; the depth in virgins, 2 to 3 cm.; in women, 3 to 3½ cm. The cavity of the uterus measures (determined by the sound) :

	Entire.	Body.	Neck.
Before puberty, . .	. 2.6 cm.	0.8 cm.	1.8 cm.
Mature virgin uterus, .	. 5.4 "	3.2 "	2.6 "
Woman (after childbirth), .	5.9 "	3.3 "	2.6 "

The secretion of the body of the uterus is thick and oily; that of the cervix, albuminous and jelly like. Both are alkaline, containing mucin, curdled by acetic acid.

Explanation of Plate 40.

FIG. 1.—Bimanual exploration; normal position of the uterus (compare description of foregoing plate) and of the tubes and ovaries. Both tubes may be felt on palpation with relaxed abdominal wall, thighs flexed 60°, as rounded cords, the ovaries the size of almonds, which slip from the grasp of the fingers. The ovaries lie 2 to 3 cm. laterally behind the uterus and toward the pelvic wall, and upon the middle portion of the psoas muscles; the healthy ovaries are very sensitive to pressure.

FIG. 2.—Retroflexion; the three degrees. 1st. Fundus higher than portio. 2d. Fundus on a level with portio. 3d. Fundus lower than portio.

FIG. 3.—Retroversion; three degrees, as above.

FIG. 4.—Anteverted and anteflexed uteri, both caused by myomata, the position of the uterus depending upon the situation of the tumor, in the cervix or body.

Tab. 40.

Fig.1.

Fig.2. Fig.3. Fig.4.

Tab. 4
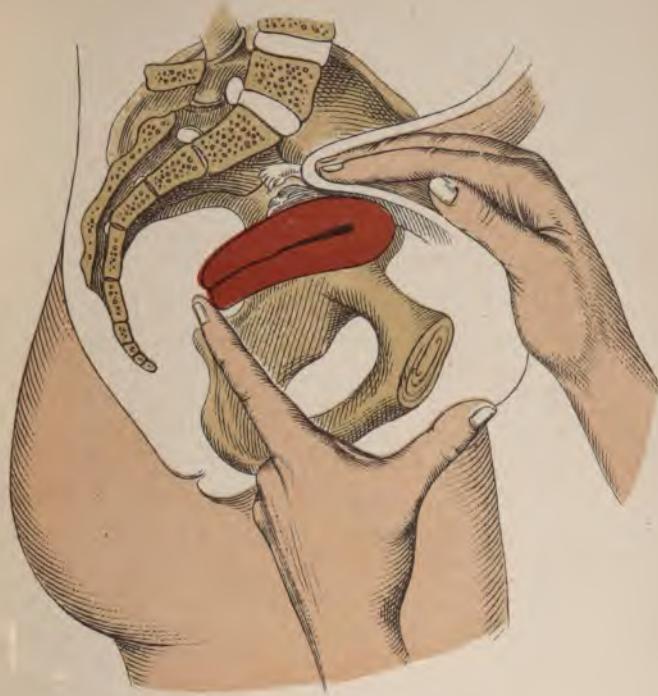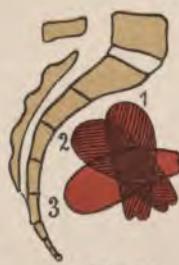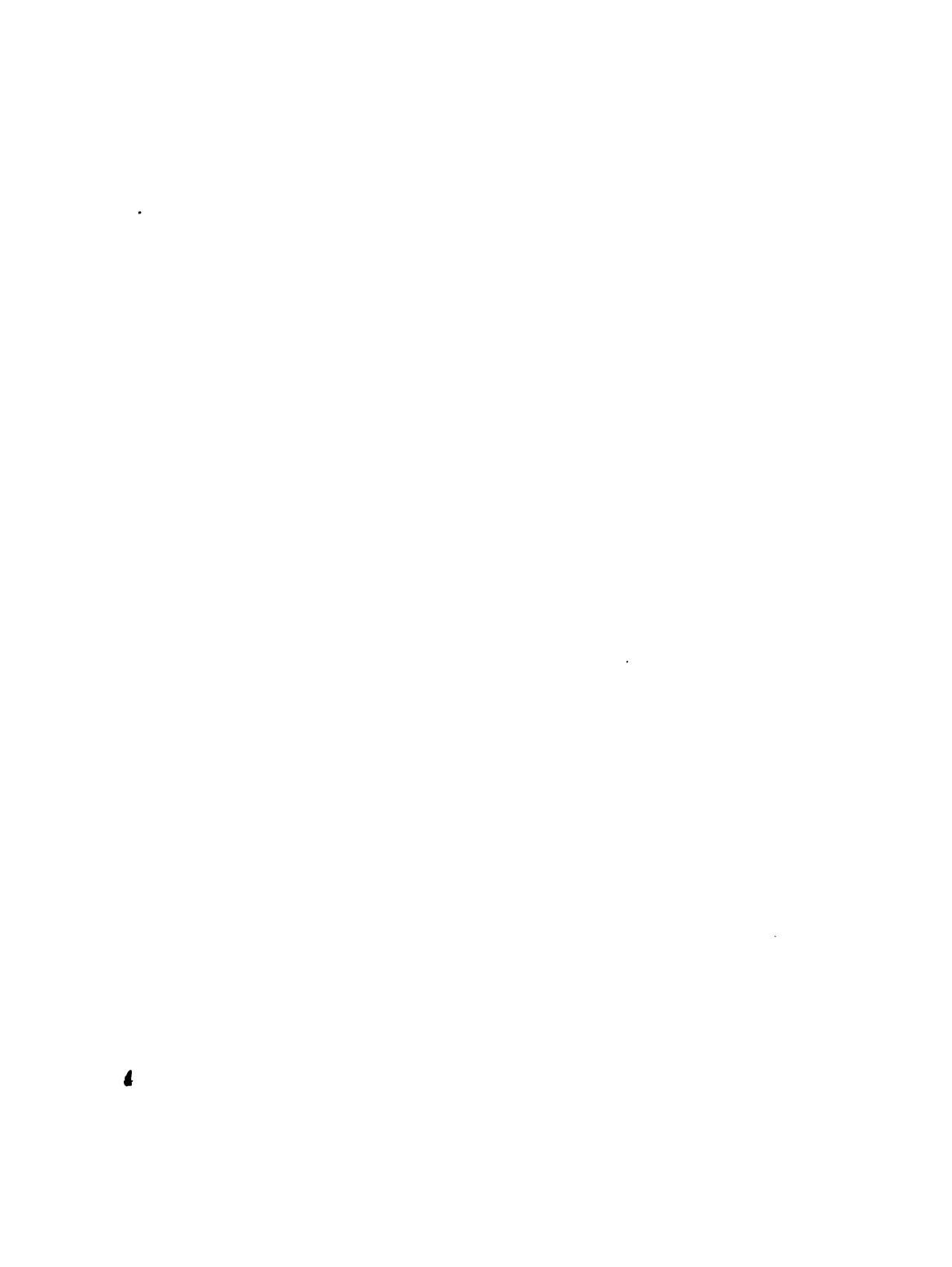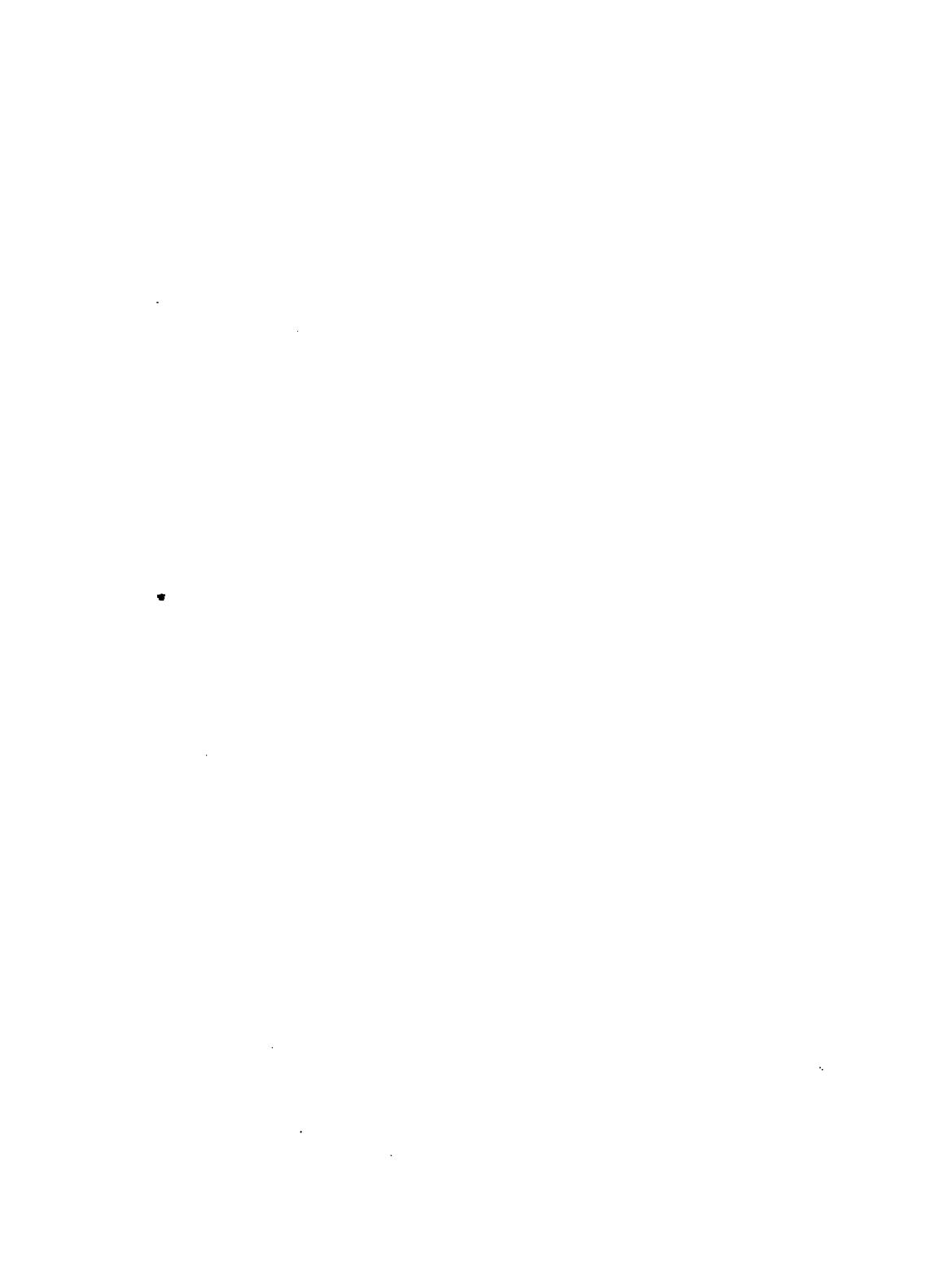
Explanation of Plate 41.

Fig. 1.—Intramural (posterior) submucous hemor-
rhagic myoma of uterus (original water color from a
preparation at the Heidelberg Clinic for Women). The
uterus has been amputated supravaginally; the anterior
wall has been cut open and the lumen is entirely filled
with a round, firmly elastic tumor which has been divided.
Its elasticity—on bimanual examination almost simulat-
ing fluctuation—was explained by the fact that the
muscular tissue had been invaded by hemorrhages.

Fibromyomata consist of smooth muscular fibres
and partly of dense, partly of loose connective tissue
(comp. Plate 46, Fig. 2). They are formed in the mus-
cular coat of the uterus, vagina, ovaries, and round
ligaments; those of the body of the uterus may be in-
tramural or intraparietal, and may extend from there
outward (see subject myoma in text and illustration).
The following varieties are distinguished:

1. Intramural fibromyoma (see above illustration and Plate 44,
Fig. 2).

2. Submucous fibromyoma (see figure on this plate). The
tumor, with its broad base, is still partly in the wall.

3. Submucous polypoid fibromyoma (comp. Plate 44, Fig. 2).
The tumor is attached by a pedicle and projects into the lumen
of the uterus.

4. Fibromyoma of the cervix (see illustration in the text).
The intraparietal tumor has invaded the cervical wall.

5. Submucous fibromyoma (comp. Plate 42, Fig. 4, and illus-
trations in the text). The tumor lifts the peritoneum.

6. Polypoid submucous fibromyoma (comp. Plate 44, Fig. 1).
The tumor gradually invades the abdominal cavity from the
uterus, to which it is bound by a pedicle.

7. Intraligamentous fibromyoma; the tumor is growing be-
tween the layers of the broad ligament.

41

Explanation of Plate 42.

FIG. 1.—Free ascites, patient in upright position (original schematic drawing). In the dorsal position the fluid (serous or sanguinolent) sinks toward the spine, and the line of anterior percussion dulness changes with it. The upper limit of the percussion dulness toward the thorax runs in a concave line; a tumor would give a convex line of dulness which varies but little. In the lateral position the dulness again changes as the fluid occupies the lowest position; the upper limit is tympanitic on percussion. Fluctuation is easily made out by palpation and percussion—the "fluid wave."

Ascites is produced by malignant tumors (papillary ovarian cysts, cancer of ovaries and intestines etc.), tuberculous peritonitis, exudative peritonitis, aside from congestive affections of the heart, lung, liver, and kidneys, and disturbances of the portal circulation.

The fluid obtained by aspiration has a light specific gravity, 1010–1015, coagulates rapidly, contains much fibrin, albumin* when it is an exudation (in inflammatory processes, i.e., tuberculosis), also red and white blood corpuscles, peritoneal endothelia, various sized cells with fat granules, and isolated cholesterin crystals. The specific gravity may rise above 1018, when it indicates an inflammatory origin; or else the fluid may be merely a transudation due to congestion, be free from fibrin, fail to coagulate, and contain only scattered white blood corpuscles and broad, flat peritoneal endothelia.

FIG. 2.—Intraperitoneal retro-uterine hæmatocele (original schematic drawing). A tensely elastic tumor of sudden apyretic development, usually in connection with a suppressed menstruation, causing Douglas' sac to bulge into the vagina, and adhering to the uterus with uniform firmness. Febrile attacks may occur subsequently and brownish masses of blood may escape from the uterus. The latter organ is anteposed. The abdominal ostium of the tube not rarely projects into the hæmatocele. The tumor is covered with layers of fibrin, probably by reason of successive hemorrhages, and forms pseudo-membranous adhesions to the intestines above it. Extra-uterine pregnancy is the usual and perhaps the invariable cause (J. Veit); not rarely villi or even the embryo can be demonstrated, as I did in a case operated upon at the Heidelberg Clinic for Women, the embryo being one month old (comp. Plate 56).

The hemorrhage is rarely so profuse as to pass over the broad ligaments into the anterior vesico-uterine excavation.

Other causes may be hæmatosalpinx (in hæmatometra from atresia), rupture of varicoceles and phlebectasiæ of the append-

* Estimation of albumin: Dilute 10–50 c.c. with 10 volumes of water, heat to the boiling point, acidulate slightly with dilute acetic acid. The precipitate is washed with water, ether, and alcohol, then dried and weighed.

Tab. 42.

Fig.1.

Fig.2.

Fig.3.

Fig.4.

Tab. 43
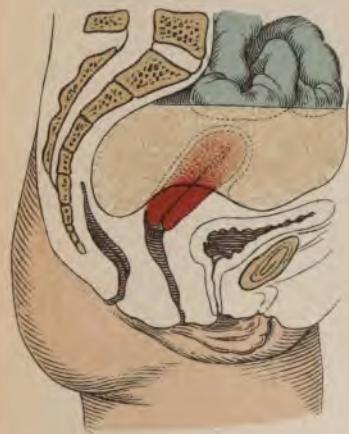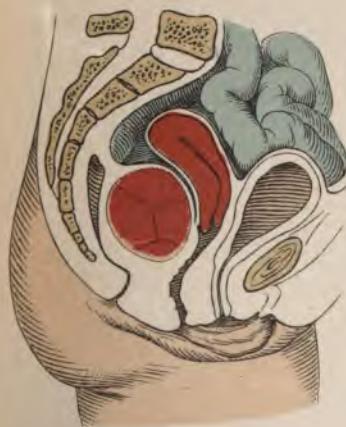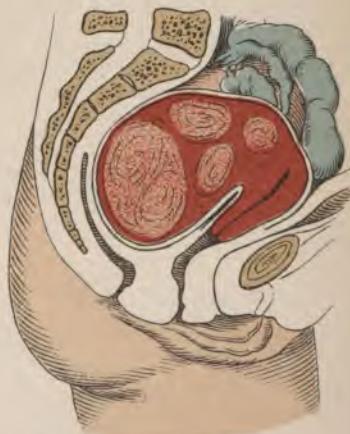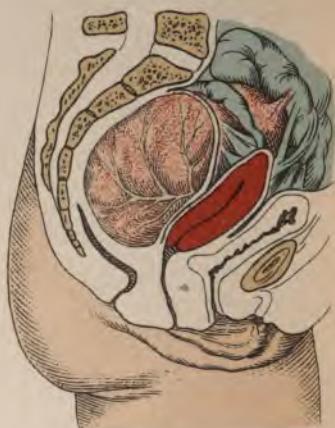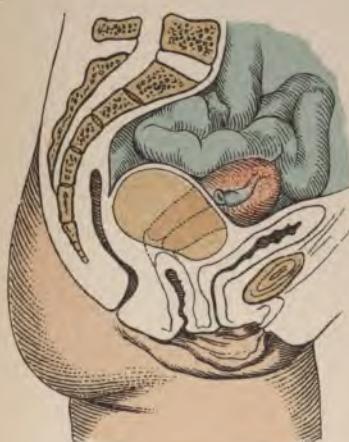
Fig.1.

Fig.2.
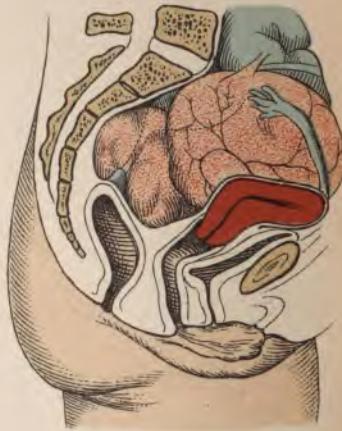
Fig.3.

Fig.4.

ages, rupture of abdominal organs, and pelvic pachyperitonitis hæmorrhagica (perimetritis).

The serum is gradually absorbed, leaving a rough, hard tumor.

Fig. 3.—Retro-uterine, extraperitoneal hæmatoma (original schematic drawing); the uterus is retroverted and flexed. Douglas' sac is free, but is encroached upon, as are the rectum and vaginal fornix, by a fluctuating tumor which may also be called a subperitoneal pelvic hæmatoma. It is caused by the rupture of a blood-vessel or of some organ (comp. "Atlas of Obstetrics," Fig. 98).

Fig. 4.—Large subserous myoma of the posterior wall of uterus (original schematic drawing), to be differentiated from retroflexion (by the sound). Anteposition of the uterus; pressure on vaginal fornix and rectum by a hard tumor, which has run a non-febrile course, and bimanually may be felt to be connected with the uterus, and moving with movements of the cervix.

Explanation of Plate 43.

Fig. 1.—Left posterior parametritis (original schematic drawing), caused by operative or puerperal infection. The inflammatory process consists of a parametritis or paracolpitis, extending later to the broad and the sacro-uterine ligaments. It consists of a yellowish, soft, doughy tumor (comp. Plate 19, Fig. 2, and Plate 44, Fig. 2) which has pushed the uterus in the opposite direction. Cicatricial contraction follows, which causes flexion and fixation of the uterus. Contraction of the sacro-uterine ligaments leads to anteflexion; that of the vesico-uterine septum of the cervix to retroversion and flexion. Other deviations are found when perimetritic adhesions are added to parametritis.

The tumor may extend into the connective tissue about the ilium and near the bladder, break down and perforate the rectum, vagina, bladder, or abdominal wall above Poupart's ligament, or it may burrow into the pelvic floor, or to the thigh, or through the sciatic foramen under the gluteal muscles. Acute wound infections may run a fatal course from general septicæmia.

Fig. 2.—Intraligamentous and retroperitoneal myxoid multilocular glandular cystoma of the left ovary (original schematic drawing) (see Fig. 53, text, Cystoma of ovary) arises from a proliferation of the germinal epithelium of the Graafian follicle, and of the superficial cuboid epithelium of the ovary (see "Atlas of Obstetrics," Fig. 47), with increase of the capillaries and of the connective tissue (comp. Plate 48).

Differential Diagnosis.—Cystomata of the ovary are met in five varieties.

1. Unilocular hypertrophy of the follicles (hydrops folliculorum).

2. Multilocular glandular myxoid. There are many-chambered,

nodular growths with a single wall, filled with myxoid jelly-like mucous fluid; according to the amount of blood they are greenish-yellow to grayish-black (see Plate 48). The tumors grow more or less rapidly and without limit (to beyond the body weight). They become dangerous when they reach the size of a head. They are fixed to the uterus by a pedicle which, after the tumor has consumed the entire tissue of the ovary, consists of the broad ligament with the tube and of the ovarian ligament; it is only in intraligamentous tumors that the pedicle is wanting (see Plate 43, Fig. 2). Only the anterior surface of the ovary (mesovarium) (see "Atlas of Obstetrics," § 16) is enclosed by the broad ligament; the posterior surface, extending to Douglas' sac, has no serous covering. If a cystoma develops from the anterior surface, it grows in the connective tissue between the two layers of the broad ligament (intraligamentous); as the tumor becomes larger the posterior surface, extending upward, lifts Douglas' sac, and lying against the spine becomes retroperitoneal (Fig. 2).

The pedicle is pathognomonic, and may be recognized as in Plate 62, and Fig. 3. In larger tumors there is generally torsion of the pedicle (see illustrations under Myoma in text); this is caused by the peristaltic movements of the intestines; by the filling and emptying of the abdominal organs, and by the movements of the body; in tumors of the left side there is most often twisting to the right of from one to two turns. When the twisting has more than one turn there is disturbance of the circulation, with extravasation into the tumor and hæmatoma in the pedicle; secondary disturbances in nutrition lead to degenerative metamorphosis, and the more rapidly the compression takes place the more rapid are the degenerative changes (necrosis, bursting of the myxoid-degenerated walls, see Plate 47, Fig. 4, causing ulceration, peritonitis, etc.). If the colloid masses escape into the abdominal cavity they cause what we know as peritoneal myxœdema (pseudo-myxoma peritonei, Werth).

Larger tumors always cause fibrinous adhesions, on account of the metamorphosis and the casting off of the surface epithelium. Sometimes the fimbriated end of the tube becomes glued together with the beginning of a cystoma, and with the disappearance of the septum a tubo-ovarian cyst forms.

3. Cystoma proliferum papillare (see explanation to figure in the text, under Cystoma of the ovary).

4. Racemose cysts (Olshausen) differ from cystic adenoma in that they contain more cysts, with no colloid but contents rich in albumin and have a pedicle; and in that when they have a broad base they have no smooth, large cystic surface, but consist of a lot of small cysts (like a hydatidiform mole, see "Atlas of Obstetrics," Fig. 130).

5. Dermoid cystoma (comp. Plate 7, Fig. 2, and Plate 45, Fig. 4).

Fig. 3 —Left pyosalpinx (original schematic drawing; comp. Plates 18, 19, and 62).

Fig. 4.—Cystic adenoma (carcinomatous) of the ovary (original schematic drawing from a case at the Heidelberg Clinic for Women). The uterus is anteflexed and anteposed by the myxoid cystoma lying above and back of it. The latter has undergone carcinomatous degeneration, and the solid masses have proliferated deep into Douglas' sac, and surround the rectum so firmly that there is complete stenosis of the latter; in such cases there is ascites with adhesion and metastasis of all the organs. In this case an artificial anus had to be made.

Carcinomata of the ovaries are of different kinds. (1) Solid papillary. (2) Like papillary cystic adenoma, but more solid. (3) Like multilocular cystic adenoma, but with areas of softening. (4) Metastases from carcinoma of the uterus; diffuse nodular growths in the enlarged ovary (very rare).

Explanation of Plate 44.

FIG. 1.—Polypoid subperitoneal fibromyoma of the uterus (original drawing from a preparation at the Munich Clinic for Women. See Plate 41, and text figure under Myoma). The tumor is made up of concentric laminated masses.

FIG. 2.—Myomatosis of the uterus; parametritic swelling about the cervix and fornices. Intramural and submucous myomata of the fundus; submucous polypoid fibromyoma of the body; pedicles stretched and twisted; the tumors have dilated the os and are dark red in color (comp. Plates 16 and 41) (original drawing from a preparation at the Munich Clinic).

Tab. 44.

Fig.1.

Fig.2.

Fig. 1.

Fig. 3.

Fig. 4.

Fig. 2.

Tab. 45.
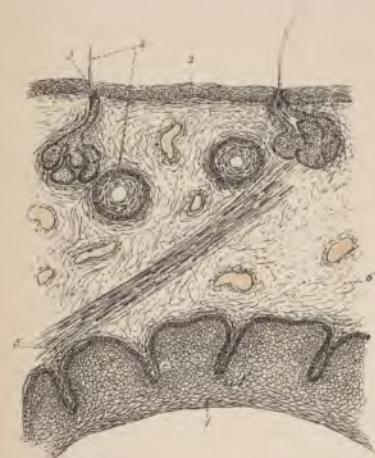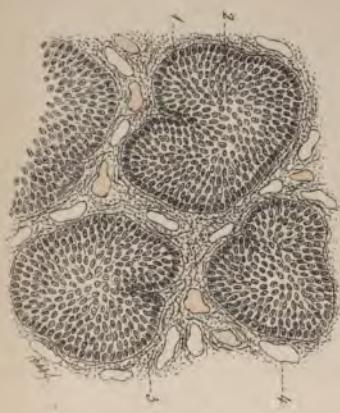
Explanation of Plate 45.

Fig. 1.—Epithelioma of the vulva (comp. Plate 2, Fig. 2). (Original drawing from the author's preparation at the Munich Clinic.) The growth has its origin from the pavement epithelium (4). We see cell cones (5) coming from the surface (4) penetrate into the stroma (3), where they form cell nests which are surrounded with connective tissue densely infiltrated with round cells. The epithelial pearls are formed from the cuboid matrix cells (1) on the boundaries of the stroma and from polygonal epithelial cells which proliferate toward the centre. Among them is a giant cell (2).

Fig. 2.—Specimen from an epitheliomatous papillary growth of the portio (original drawing from the author's preparation at the Munich clinic). 1, Epitheliomatous papilla, in the centre of which is connective tissue infiltrated with round cells and containing thick-walled blood-vessels; on the outside flattened epithelium. 2, Connective tissue, with nests of cancer cells. 3, Extravasated blood.

Fig. 3.—Epithelioma pearls from an ulcer of the cervix, structure the same as in Fig. 1. 1, Cuboid matrix cells. 2, Polygonal cancer epithelium. 3, Connective tissue, infiltrated with round cells and traversed by dilated capillaries. 4, Lymph capillaries (original drawing from the author's specimen at the Munich Clinic).

Fig. 4.—Dermoid cystoma (comp. Plate 17, Fig. 2). (Original drawing from the author's specimen at the Munich Clinic.) 1, Superficial pavement epithelium with papillary connective tissue. 2, Low pavement epithelial cells upon the flat stroma. 3, Hair with follicular coil gland with cuboid epithelium. 4, Cross-section of a hair. 5, Muscle fibres. 6, Connective tissue.

Dermoid cysts have their origin generally in the ovary (very seldom in the vulva) and they are developed from the same connective-tissue elements as the cystomata, with this difference, however, that they have a cutaneous character, and are made up of every part of the epidermis, even of adipose tissue; besides this there is scarcely any combination of the tissues and organs of the body which may not grow in these tumors (jaw bones with teeth, brain substance, eyes, etc.); they are filled with fatty matter and light hair.

This dermoid structure is also found in adenocystoma, and on the other hand dermoid cysts may undergo carcinomatous degeneration. Otherwise, the dermoid cystomata are unilocular with thick walls, and are from the size of a man's fist to that of a head.

Their etiology is in doubt. They are possibly due to "intrafoetation," through division and displacement of germ layers.

47

Explanation of Plate 46.

Fig. 1. —Mucous polyp of uterus (original drawing from the author's preparation at the Munich Clinic). Circumscribed proliferation of the uterine mucosa (body and cervix), consisting of glandular and connective tissue, with a typical mucous-membrane structure (in contradistinction to the atypical growth of the malignant adenomata (comp. Plate 7, Fig. 3). The gland spaces (1) invested with cylindrical epithelium, therefore, resemble true glands. In the connective tissue (3) lie many thin-walled dilated capillaries (2 and 4), and this is the reason why polyps bleed so easily.

Fig. 2.—Section through the transitional zone of a myoma the size of a grain of wheat (beginning to be encapsulated) in the normal muscular layer of the uterus (original drawing from the author's specimen at the Munich Clinic). The tissue (1) of the tumor on the left consists only of closely crowded, felted, smooth muscular fibres, without connective tissue, such as is found without exception in larger tumors (fibromycmata) which always result from such true intramural mycma. The boundary layer (2) of the normal muscular tissue consists of concentric parallel lamellæ, which have evidently been passively compressed by the rapid growth. There are also greatly dilated blood-vessels (4) in the less parallel fibres of the muscular coat (3).

Fig. 3.—Lymphosarcoma of the vagina (original drawing from the author's specimen at the Munich Clinic). In the vaginal wall malignant sarcomata occur besides the benign fibromyomata; they are rare, and may be congenital. One kind is of a fibrous, another of a round-celled type. Our preparation is of the latter variety, with this complication—that, in addition to the round-celled proliferation, the normal lymph follicles of the vagina (3, surrounded by round cells and lymph vessels) have likewise proliferated. 1, Normal vaginal epithelia; 2, normal connective tissue.

Tab.

Fig.1.

C
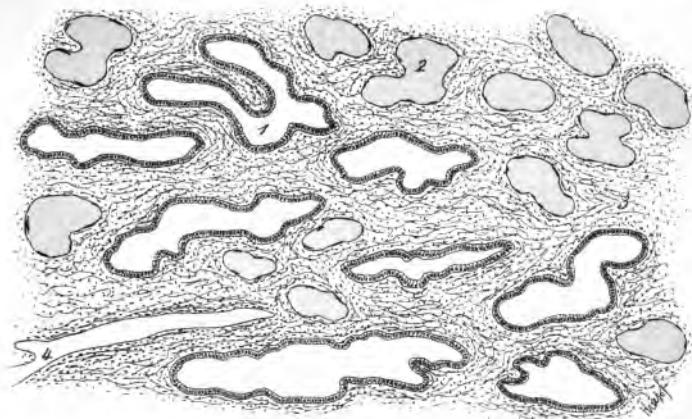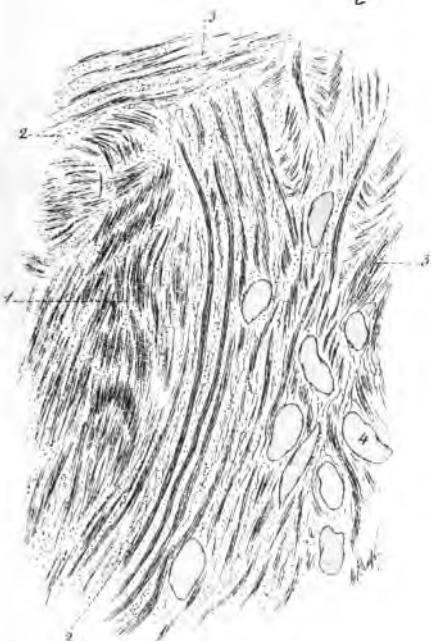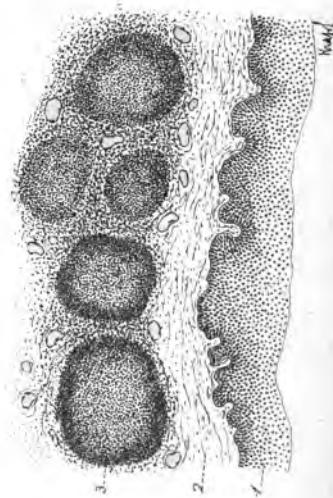
Fig.2.

Fig.3.

Tab. 47.

Fig.1.
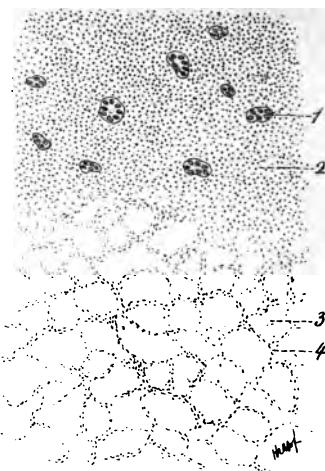
Fig.2.
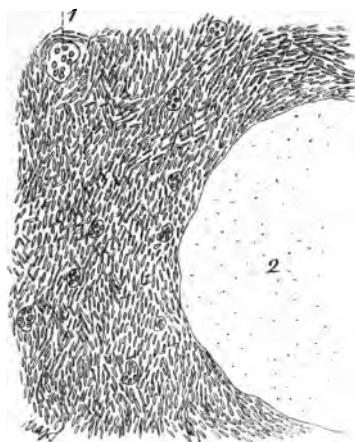
Fig.3.
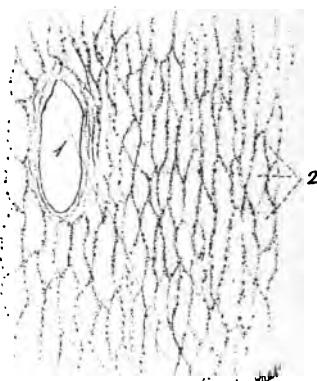
Fig. 4
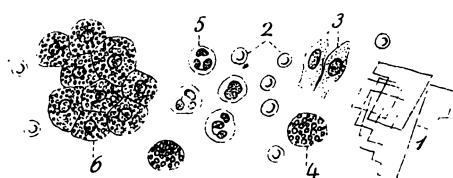
Fig.5.

Explanation of Plate 47.

FIG. 1.—Angioma of the urethra (original drawing from the author's preparation) made up of densely crowded blood capillaries (1) invested only with an endothelial layer, in the connective tissue (2) (compare remarks to Plate 3, Fig. 1).

FIG. 2.—Myxosarcoma of the uterus (original drawing from the author's specimen at the Munich Clinic). This may be a primary formation or result from an extremely rapidly growing fibroma which has undergone degenerative changes from insufficient nourishment or infection. 1, Malignant giant cells; 2, round-cell proliferation; 3 and 4, myxomatous connective tissue, the fibres of which are crowded apart (see Fig. 3).

FIG. 3.—Spindle-celled sarcoma of the uterus, with cysts (2). 1, Giant cells which are numerous in the spindle-celled tissue (original drawing from the author's specimen at the Munich Clinic). (Comp. Plate 53, Fig. 2.)

Sarcomata are tumors of the connective-tissue type, with abnormal predominance of the cell elements (round, spindle, giant, and stellate cells). They grow very rapidly, and are brittle, lobulated tumors which have an extraordinary tendency to form metastases or to relapse, and differ from epithelioma most markedly in their frequent appearance in the early years of life. They develop in the urinary tract, in the vulva, vagina, uterus, ovaries, and the appendages.

In the vulva they are round, spindle, myxoid, or pigment celled (melanosarcoma). In the vagina, see Plate 46, Fig. 3. In the uterus, see Plate 53, Fig. 2. In the ovaries they are of the spindle-celled type, with or without the development of cysts.

FIG. 4.—Necrotic wall of a cystoma; myxomatous degeneration and separation of the fibres of the connective tissue (2). 1, Lumen of a blood-vessel (original drawing from the author's specimen).

FIG. 5.—Sediment of the fluid contents of a cyst of the ovary. 1, Cholesterin crystals; 2, red blood cells; 3, granulated cylindrical epithelia; 4, cells undergoing fatty degeneration; 5, leucocytes; 6, endothelium (original drawing).

Explanation of Plate 48.

Fɪɢ. 1.—Primary cyst formation in a multilocular glandular myxocystoma of the ovary (original drawing; see illustration in the text). The different cystic cavities (1) are caused by the myxoid degeneration and rupture of the walls (2 and 3), which float in the fluid colloid contents as free papillæ. 4, Small cysts; 5, connective tissue.

Fɪɢ. 2.—Proliferating papillary cystoma of the ovary (original drawing from the author's specimen at the Munich Clinic). 1, Broad papilla with cyst (2), surrounded, as is the entire interior of the cyst, with cylindrical epithelium (4); 5, folds of the epithelium; 3, cross section of papillæ; 8, delicate dendritic papillæ; 6, dense connective tissue of the wall of the cyst; 7, wavy elastic tissue of the external connective-tissue layer (comp. illustration in the text).

Fɪɢ. 3.—Invasion of the wall of a cystoma by malignant adenoma (original drawing, partly schematic, from the author's preparation at the Munich Clinic). 1, The superficial cylindrical epithelium, proliferating, forms an atypical adenomatous mass (6), consisting of glandular cystic cavities (7) with cylindrical epithelium (6), which in different places is stratified (8); between the separate growths few connective-tissue fibres (9). The perforated wall consists of hard fibrillary connective tissue (2) underneath the cylindrical epithelium (1). 3, Wavy elastic tissue with thin-walled blood-vessels (4) and exteriorly the serous endothelial covering (5).

Tab. 48.

Fig.1.

Fig.2.

Fig.3.

Fig.1.

Fig.2.

Tab. 49.
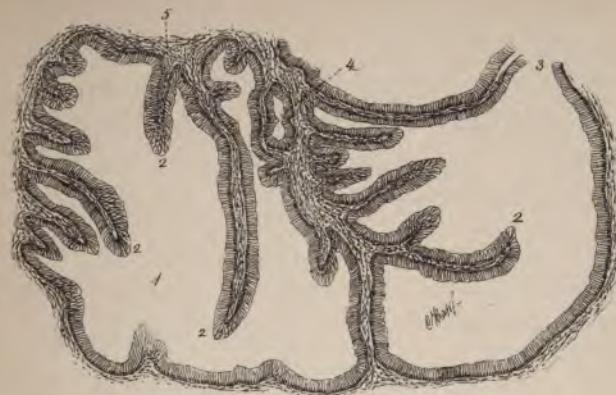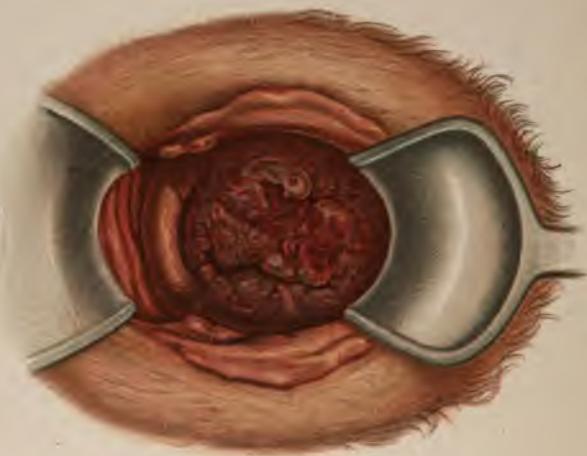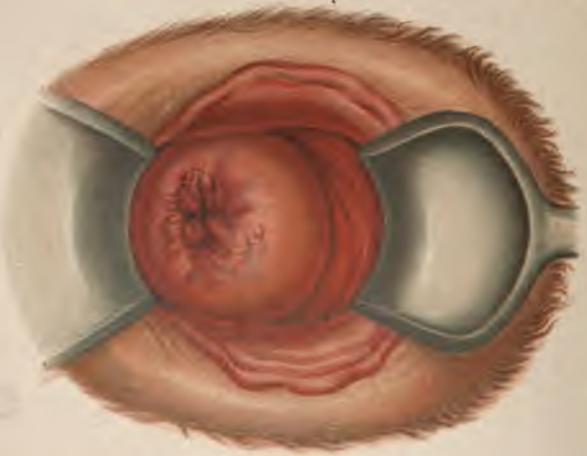
Explanation of Plate 49.

FIG. 1.—Papillary epithelioma of the anterior lip of uterus, and of the anterior fornix (original water color; speculum picture; comp. Plates 45, 54, and 57); tubercular bluish-red masses, with rather flat surface, make it difficult for the finger to find the os on palpation.

FIG. 2.—Commencing epithelioma of cervix (original drawing after a case of von Winckel); small roundish nodules develop about the external os under the mucous membrane from the cervix and ulcerate (comp. Plate 58, Fig. 1).

Explanation of Plate 50.

FIG. 1.—Papillary erosion (original water color, comp. Plate 5, Fig. 3; Plates 14 and 15); often leads in later life to papillary epitheliomatous growths.

FIG. 2.—Epitheliomatous papillary tumor of posterior lip (cauliflower growth). (Original water color from the author's preparation at the Munich Clinic.) These tumors grow as papillæ, almost polypoid, but not superficially (comp. Plate 57, Figs. 3 and 4).

Tab. 50.
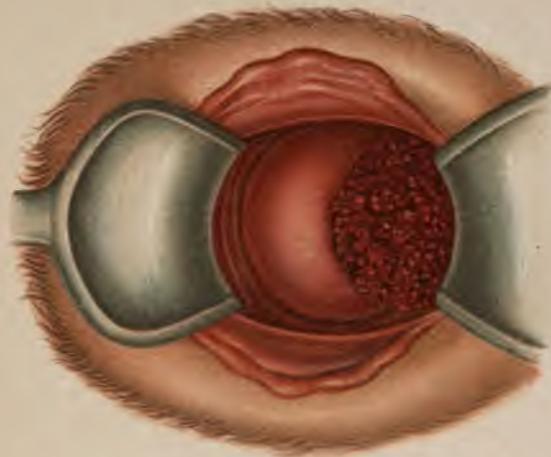
Fig.2.
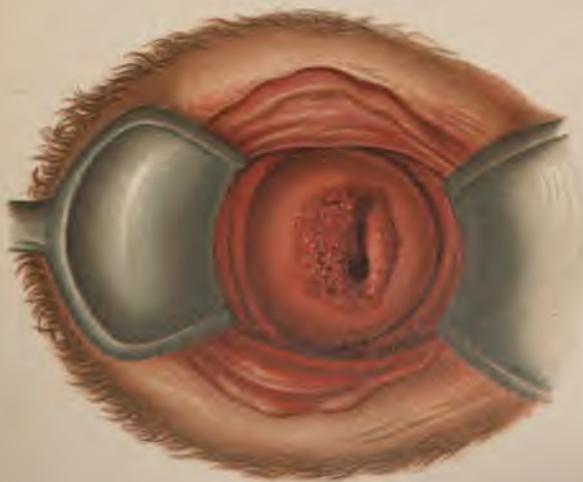
Fig.1.

Fig.1.

Fig.2.

Tab. 51.
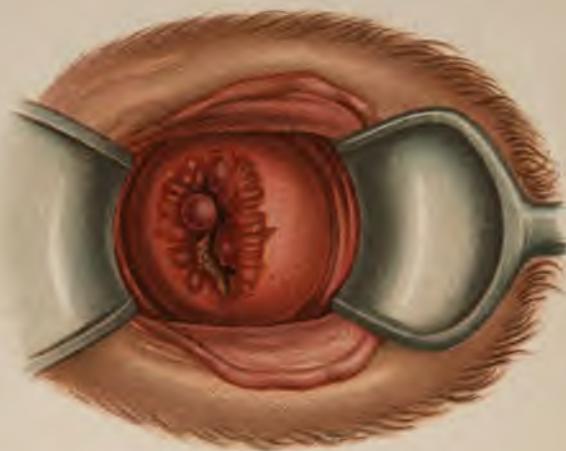
Explanation of Plate 51.

FIGS. 1 and 2.—Epitheliomatous ulcer of the cervical canal (speculum picture and section of the preparation; comp. Plate 58, Fig. 2). The growth itself consists partly of the solitary primary nodules, and partly of the ulceration of the latter; the extension of the nodules into the wall is shown in Fig. 2.

Explanation of Plate 52.

FIG. 1.—Larger epitheliomatous nodules of the cervix, showing under the mucous membrane of the portio. Simple erosion of the os (speculum picture; original water color after a preparation of von Winckel). A spot of commencing ulceration on the anterior lip.

FIG. 2.—Superficial ulcerating epithelioma of the portio vaginalis (posterior lip), and of the posterior fornix (speculum picture; original water color. Comp. Plate 57, Fig. 1).

Tab. 52.

Fig.2.

Fig.1.

.

.
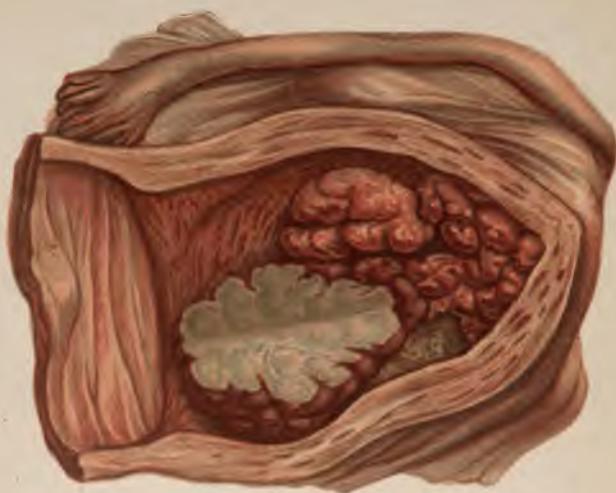
Fig.1.

Fig.2.
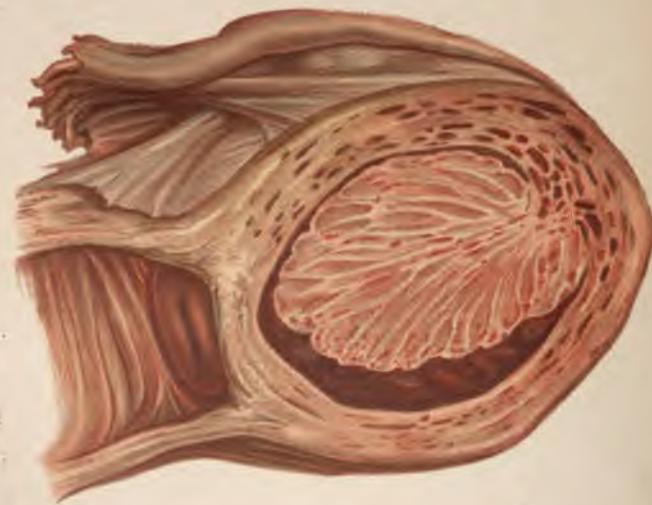
Explanation of Plate 53.

FIG. 1.—Carcinoma of the body of the uterus (original water color after a preparation of von Winckel). Nodular, soft, friable, bluish-red masses situated upon the mucous membrane and proliferating into the depth, developing either as solid cell cones from the superficial epithelium, or from the glands as a malignant adenoma.

FIG. 2. Sarcoma of the uterus (original water color from the author's specimen at the Munich Clinic). A friable, fibrous mass, like punk, springing from myxoid degeneration of a fibroma, developing in the mucous, muscular, or subperitoneal coat (comp. Plate 47).

Explanation of Plate 54.

FIG. 1.—Papillary cancer of both lips; extensive ulceration involving the anterior vaginal fornix, and extending into the depth (original water color).

FIG. 2.—Cancerous ulcer of cervix (original water color); the os and portio vaginalis are intact. The lips, however, and the walls of the cervix are greatly thickened by the extension of the process. The cervical surface is ulcerated, and in one place there is a deep ulcer (easily recognized by a sound) between the os externum and internum. In the wall itself are broken-down cysts filled with sloughing masses. In the body of the uterus are a few solitary cancerous nodules. The cervix is greatly enlarged compared with the body.

Tab. 54.

Fig. 2.

Fig. 1.

Fig. 1.

Fig. 2.

Tab. 55.

Explanation of Plate 55.

FIG. 1.—Cancerous cervical ulcer, perforating into the bladder (original water color). The os itself can be seen almost unchanged, despite the extensive destruction behind it. Greenish-gray masses of sloughing tissue and necrotic débris cover the bottom of the cancerous ulcer. Nests of cancer cells are scattered through the walls of the body of the uterus (comp. Plate 58, Fig. 5).

FIG. 2.—Perforation of a cancerous cervical ulcer into both bladder and rectum (original water color after a preparation of von Winckel). The ulceration has extended to the os and the vagina (comp. Plate 58, Fig. 6).

Explanation of Plate 56.

Retro-uterine hæmatocele, with extra-uterine fœtal sac. I found a one month's embryo above and to the left, near the tube (original water color, after a specimen at the Heidelberg Clinic).

Tab. 56.

Tab. 57.
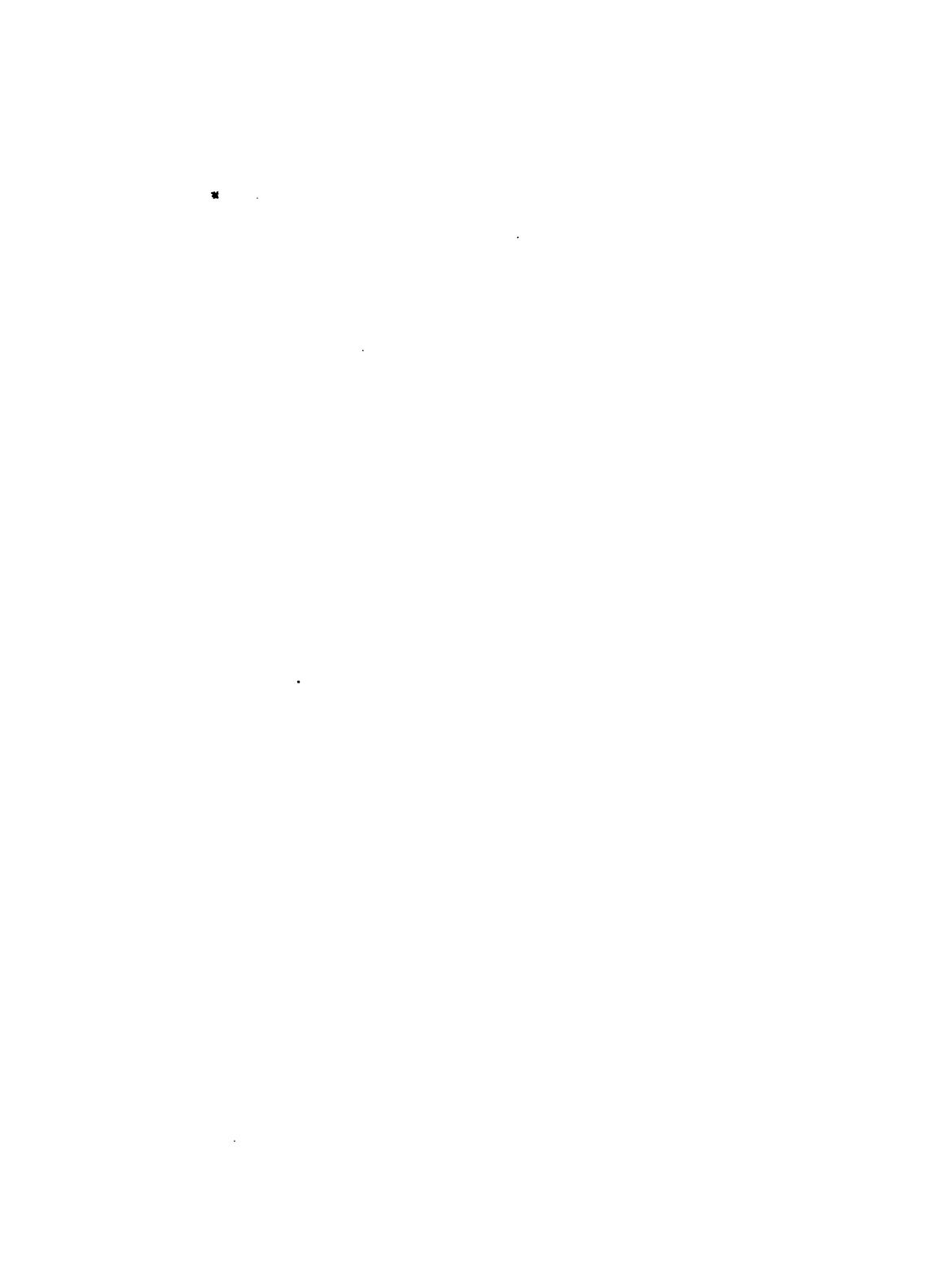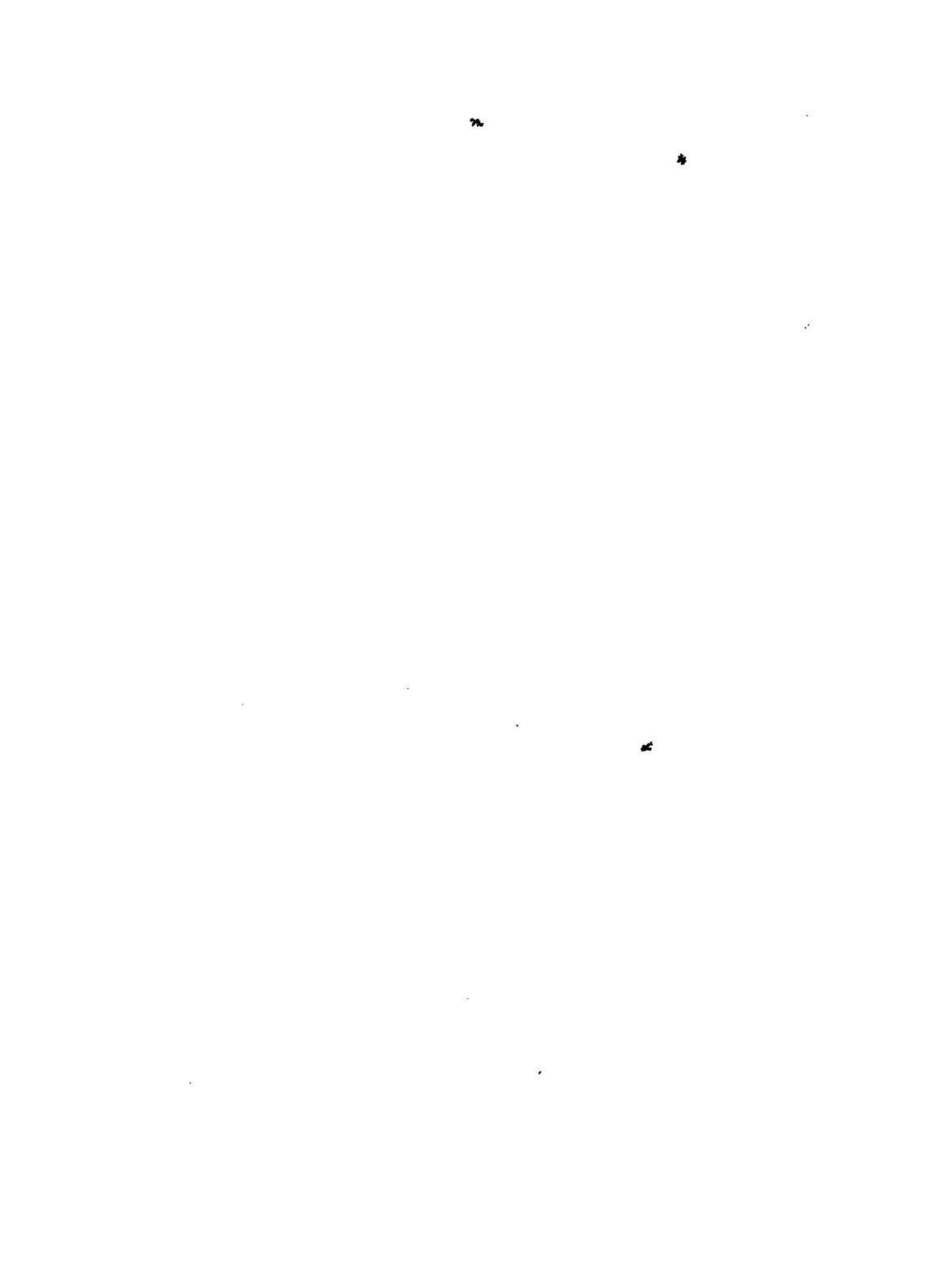
Fig.1.

Fig.2.

Fig.3.

Fig.4.

Fig.5.

Fig.6.

Explanation of Plate 57.

FIG. 1.—Superficial cancer of both lips, extending to the vaginal fornices (original schematic drawing). There are two varieties of cancer of the portio vaginalis: (1) that which extends superficially; (2) that which causes a papillary tumor. Both consist of cell cones derived from the proliferating pavement epithelium (comp. Plate 47).

FIG. 2.—Papillary cancerous growth of both lips (original schematic drawing; comp. Plate 54, Fig. 1).

FIG. 3.—Polypoid cancerous growths of the anterior lip (original schematic drawing).

. FIG. 4.—Cancerous papillary tumor of the posterior lip, filling the entire posterior vaginal fornix (original schematic drawing).

FIG. 5.—Villous cancer of bladder, most often found near the opening of the ureters; it has eaten through the vesico-vaginal septum. It gives rise to cystitis. Cancer cells and shreds of tissue may be found in the urine (original schematic drawing).

FIG. 6.—Carcinoma (malignant adenoma) of the rectum (original schematic drawing), perforating the rectovaginal septum. Crater-like degeneration, and, on exploration, two points of stenosis are found, between which there is considerable dilatation (original schematic drawing).

Explanation of Plate 58.

FIG. 1.—Cancer nodules in the cervix, not ulcerated; os closed. Anterior lip thickened or infiltrated with nodules (comp. Plates 50 to 52; original schematic drawing).

FIG. 2.—Cancerous cervical ulcer; os closed (comp. Plate 54, Fig. 2. Original schematic drawing).

FIG. 3.—Cancerous cervical ulcer, extending into the body of the uterus (original schematic drawing).

FIG. 4.—Cancerous growth of the body, perforating into the bladder (comp. Plate 55, Fig. 1); os intact (original schematic drawing).

FIG. 5.—Cancerous ulcer of the cervix, perforating into the bladder; fundus intact, os destroyed (original schematic drawing).

FIG. 6.—Cancerous cervical ulcer, perforating into both bladder and rectum (comp. Plate 55, Fig. 2; original schematic drawing).

Tab. 58.

Fig.1.

Fig.2.

Fig.3.

Fig.4.

Fig.5.

Fig.6.

Tab. 59.
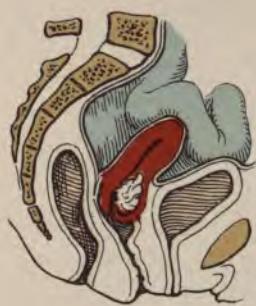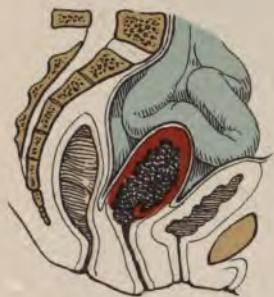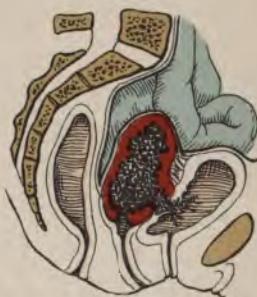
Fig.1.

Fig.2.

Fig.3.

Fig.4.

Explanation of Plate 59.

Four changes of the os externum from tumors (original schematic drawing).

FIG. 1.—Endometritis fungosa and ectropion. Cystic glands in the mucosa of the cervix (comp. Plates 7, 8, and 12).

FIG. 2.—Cancerous papillary growths of both lips (comp. Plate 54, Fig. 1).

FIG. 3.—Nabothian ovules showing in a mucous polyp (comp. Plate 16, Fig. 1).

FIG. 4.—Fibrous polyp pressing apart the lips of the os (comp. Plate 16, Fig. 2).

Explanation of Plate 60.

Fig. 1.—Reposition of the retroverted uterus with bullet forceps (after Küstner). The uterus is first pulled into the vertical position and the portio pushed backward; the result is that the fundus (if free) goes forward.

Fig. 2.—Reposition of the retroverted uterus with a sound. This is passed, as usual, with its concavity forward until the tip has passed the internal os; then, following the pathological axis of the uterus, the concavity is turned backward. We know that the tip lies at the fundus when the sound extends from 5 to 6 cm. into the uterus. The bent end is turned forward while the handle is depressed backward. This should be done carefully.

Fig. 3.—Introduction of Mayer's elastic ring pessary, with Fritsch's forceps. The ring should encircle the portio (after Fritsch).

Fig. 4.—Introduction of a Hodge pessary. This is S-shaped, as is shown in the figure (Thomas' pessary is more curved at the upper ring). (See Figs. 24 to 27 in the text.)

On the Introduction of Pessaries.

The patient being on the back or in the knee-elbow position, the vagina is distended by atmospheric pressure after being stretched with a grooved speculum, the uterus and adnexa falling forward.

1. The round, flexible india-rubber ring of Mayer is introduced with the hand or by means of a Fritsch forceps, being pressed together until it passes the constrictor vaginæ muscle, and is left in such a position that the portio extends into the opening of the ring, which should not be too small. The ring should distend the vagina somewhat.

2. Hodge's or Thomas' hard-rubber pessary (first placed in hot water to soften it) is introduced vertically into the vulva (see Fig. 4) ; after the pessary has passed above the constrictor vaginæ it is turned at an angle of 90°, so that the upper broad bend lies against the posterior vaginal fornix (see Fig. 24 in text). It operates as follows: the broad bend lifts the fundus of the uterus and acts as a lever to push it forward; the portio is forced backward by the stretching of the vagina in both axes; the uterus rests firmly upon the posterior vaginal wall, which

Tab. 60.

Fig.1.

Fig.2.

Fig.3.

Fig.4.

.
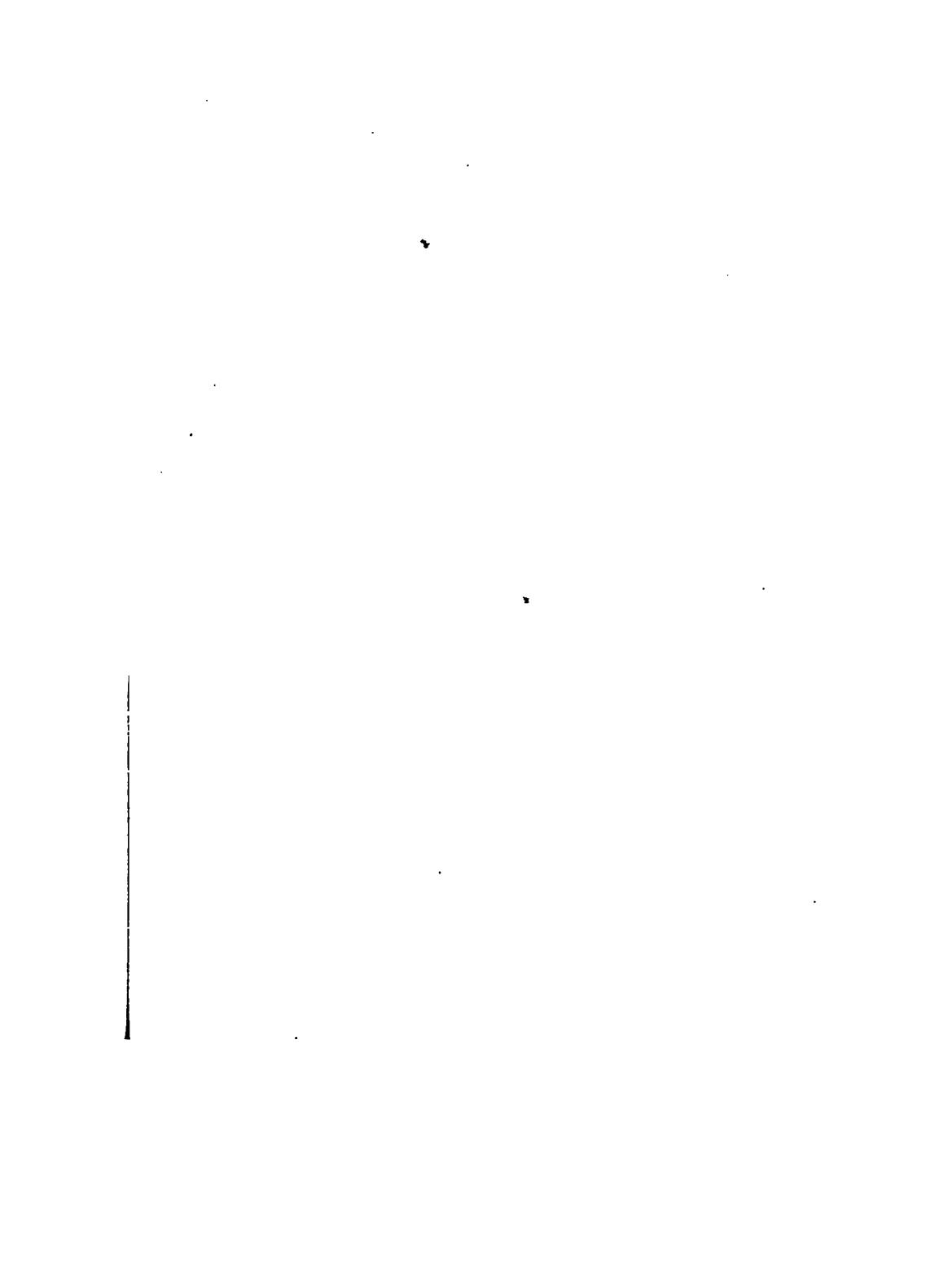
Tab. 61.
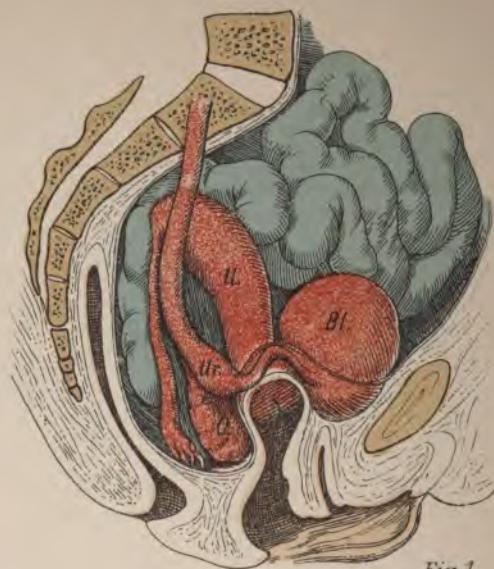
Fig.1.
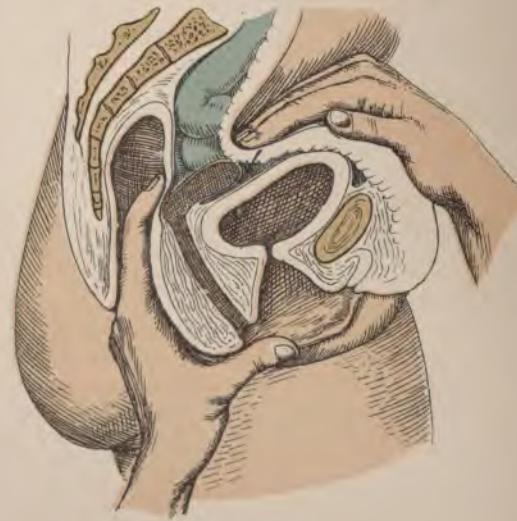
Fig.2.

both stops its fall and removes the discomfort. At the same time the lateral pressure and lifting of the fornix put an end to the tension of the sacro-uterine ligaments. In married women only the simple bent pessary, in which the lower bend rests against the symphysis, should be used, in order that sexual intercourse may be made possible. Should this make urination difficult, a strong anterior bowing of the pessary should be made; if the superior bend presses too hard against the vagina it should be bent backward.

3. The figure-eight pessary of Schultze is introduced with its small end around the portio and fixed in this position (see Fig. 25 in the text). It is made of hard-rubber or of copper wire covered with gutta-percha. It rests upon the pelvic floor.

4. The sleigh pessary of Schultze is introduced so that the long bend lies above and behind the portio, and the short bend in front of the same (see Fig. 27 in the text); the anterior convex bend rests against the symphysis, and, therefore, this pessary should be used where the floor of the pelvis is weak. If the vagina is too wide, the longer bend must be used as a support and brought forward, while the smaller grasps in its concavity the portio (see Fig. 26 in the text). The figure-eight pessary is made from rings 8½ to 10 cm. large; the sleigh pessary from rings 10½ to 14 cm. wide and 7 to 10 mm. thick.

A pessary lies well if its lower end is not visible in the vulva; if it does not tend to fall out; if it does not stretch the vagina too much, but is easily movable on its long axis; if it stretches well the fornix or upper vagina; and, finally, if the fundus lies in its normal position anteriorly, and the portio posteriorly, so that Douglas' folds are not stretched. Under these conditions the pains disappear extremely quickly, but only one-fifth of all the cases recover so that a pessary need not be worn.

Disadvantages.—If the pessary is not of the proper shape and material, if it is too large or remains *in situ* too long, it causes increased secretion, erosion, and ulceration, which may eventually bring about fistula into other organs. If the ulcers heal with the instrument in place, or the pessary becomes encrusted, it is very difficult to remove it. Under these conditions the pessary should be seized with forceps and extracted by a spiral motion, after removal of the granulations. To avoid such complications the pessary should be removed and cleaned after each period at least once a month, although a good pessary may re-

main in a healthy vagina two to three months without evil results; in some cases it is necessary to irrigate the vagina frequently, every day if there is leucorrhœa. The pessary should be removed immediately if there is any pain. It is important to determine if the pain is due to the position of the pessary or to a complication.

Explanation of Plate 61.

Fig. 1.—Retroversion of the uterus; ovariocele vaginalis, flexion and dilatation of the ureters; vertical position of the vagina (original schematic drawing). See §§ 7 and 11.

Fig. 2.—Bimanual exploration from the rectum in total atresia of the vagina and a solid rudimentary uterus. From the impossibility of normal cohabitation, the penis has been introduced into the urethra, which has been dilated to the internal sphincter; the finger may be introduced without trouble into the bladder, urine following its withdrawal; comp. § 1 (original schematic drawing).

Explanation of Plate 62.

Figs. 1 and 2.—Bimanual exploration of a pyosalpinx, the rectum being constipated and emptied, respectively (original schematic drawing). In such a case the bladder and rectum must be emptied; mistakes as to the size and form of the tumors are very easily made, owing to the changes in position of the organs which have taken place. *Py*, pyosalpinx; *R*, rectum; *U*, uterus.

Fig. 3.—Bimanual exploration of the pedicle of a cystoma of the ovary, with assistance, after B. S. Schultze (original schematic drawing). The uterus has been pulled down with dressing forceps. The cystoma has been lifted from without; palpation takes place from the rectum, and under the tumor; in this manner the pedicle may be felt. In this particular figure it happens to be twisted.

Tab. 62.
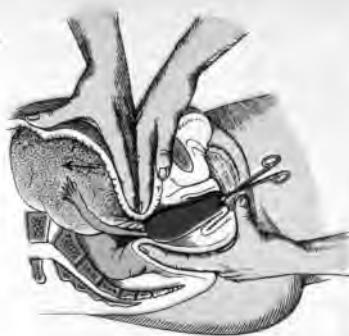
Fig.3.
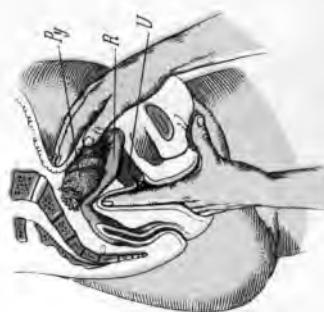
Fig.2.
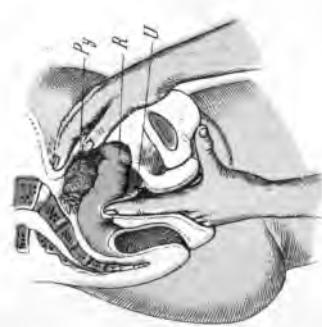
Fig.1.

Tab. 63.

Fig. 1.
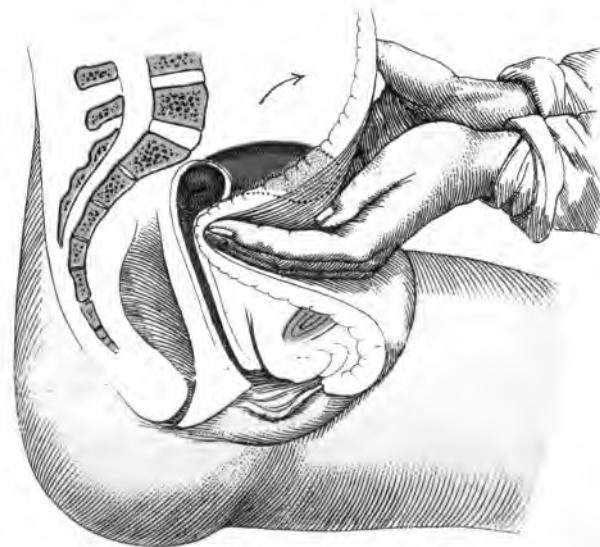
Fig. 2.

Explanation of Plate 63.

Massage (Thure Brandt). By similar manipulations as were used in Plates 38 to 40, the ends of the fingers are introduced behind the retroverted uterus, and the adhesions between the latter and the rectum are rubbed and stretched; the circulation in the adhesions is stimulated so that they become softer and more yielding. The uterus is then raised or pushed up (Fig. 2) to stretch the parametritic adhesions (original schematic drawing).

Explanation of Plate 64.

FIG. 1.—Normal perineum, affording support to the vaginal walls, and also to the uterus (original schematic drawing). The intact perineum forms the deepest part of the vulva, and lies lower than the end of the anterior vaginal wall as far as the opening of the urethra. It describes a triangle under the vaginal opening, so that the tuberculum vaginæ can find support upon the perineum. The entire posterior vaginal wall is also supported by the perineum, and supports in its turn the upper half of the anterior vaginal wall. The normal portio presses against the posterior fornix and the body of the uterus rests against the anterior. The perineum, indeed, is of great importance in affording support to the internal genital organs, aside from the ligaments and the constrictor vaginæ and levator ani muscles.

FIG. 2.—Perineal rupture, third degree. Inversion of the anterior vaginal walls, with beginning cystocele; falling of the uterus from weakening of the anterior vaginal vault (original schematic drawing).

FIG. 3.—Perineal rupture, first to second degrees. It is plain how the anterior vaginal wall has lost its support (original schematic drawing).

FIG. 4.—Perineal rupture, third degree. Inversion and prolapse of posterior vaginal wall; beginning retroversion of the uterus (original schematic drawing).

Tab. 64.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.
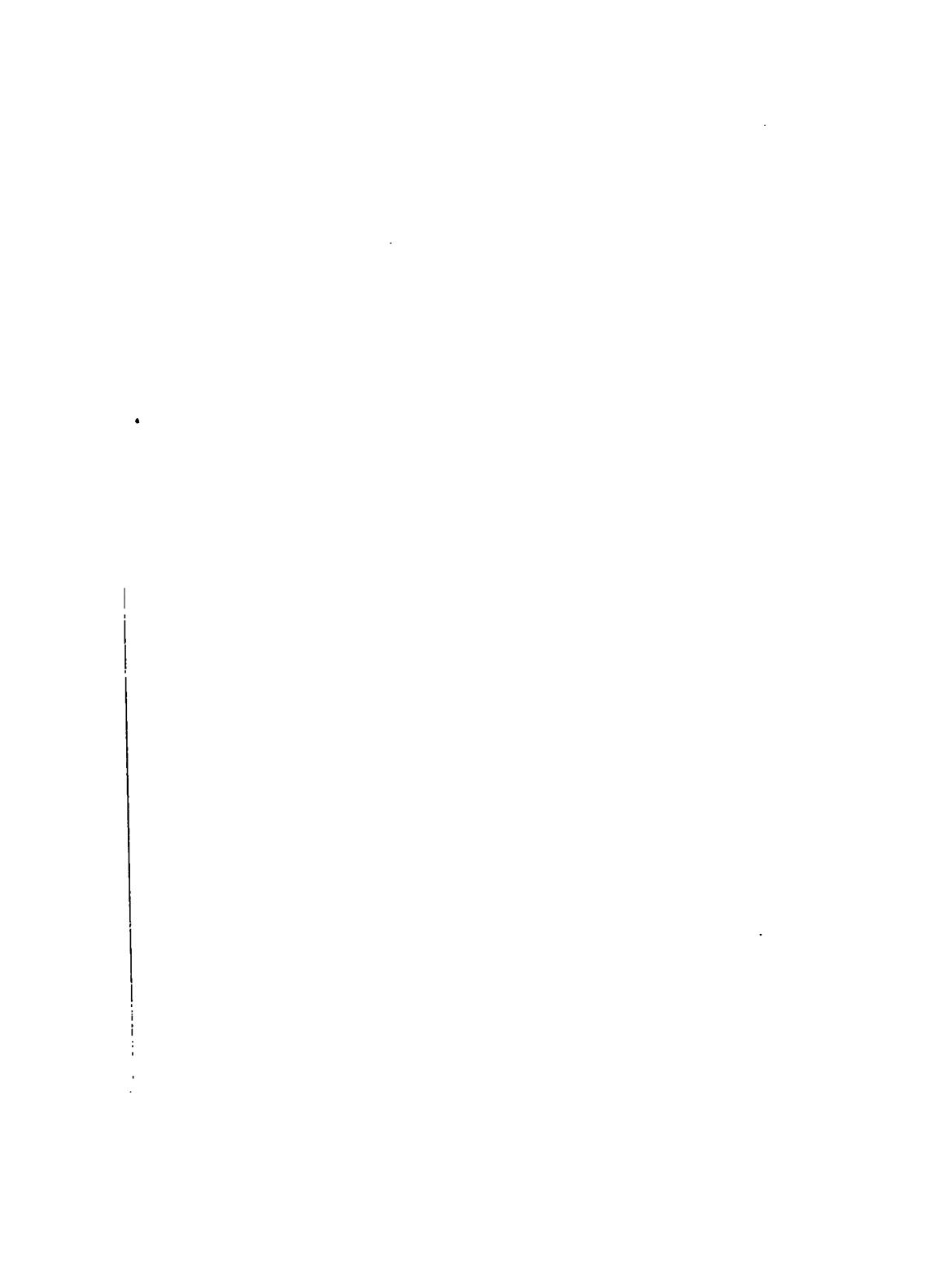
PART I.

Malformations and Arrests of Development.

CHAPTER I.

FŒTAL MALFORMATIONS.

The malformations of the female genitalia are almost exclusively arrests of formation. The differentiation of the two Müller's ducts is either absent or partial or they coalesce incompletely so that their union into one canal is lacking either in part or entirely.

This explains, on the one hand, the defects of the entire genital tract or of individual parts of the organs, and likewise the congenital atresiæ and fistulæ, and, on the other hand, the partial or complete reduplication of the genital canal.

Clinically the following forms are important in regard to sexual life:

§ 1. APLASIÆ AND HYPOPLASIÆ OF THE FŒTAL CANAL.

1. Absence of the appendages of the uterus;
2. Absence of the uterus (defectus uteri);
3. Absence of the entire genital tract—with or without
4. Hermaphroditism and pseudohermaphroditism;
5. Uterus unicornis, i.e., absence of part of a Müller's duct (tube and uterine canal of one side);

6

6. Atresiæ, band-shaped or diaphragmatic, in the cervix uteri and corresponding to the internal or external os, in the vagina, hymen, or vulva.

7. Vagino-rectal or vulvo-rectal fistula (atresia ani vaginalis, hymenalis, or cloaca vaginalis, fistula recto-vestibularis);

8. Epispadia et hypospadia feminalis.

1 and 2. *Entire absence of the uterus and its append-*

FIG. 1.—Fœtal Genitalia Divided in the Sagittal Median Plane, so that the divided symphysis is thrown back on each side. Absence of uterus.

ages is very rare and is naturally discovered, as a rule, during the years of puberty. In place of the uterus solid bundles of muscle commonly pass from a rudimentary vagina upward in the broad ligaments, which are recognizable as a small transverse wall in the pelvis. But while the vulva is usually well developed (at the most there are atrophy of the clitoris, absence of the hair on the mons veneris, small size of the breasts), the ovaries are usually undeveloped or entirely absent. The Fallopian tubes form, at the

most, a mere hollow canal in the ampullary part. In one case* I found entire absence of the appendages and the uterus, but at the same time the vagina was elongated, so that probably a part of the fœtal uterus aided in the production of this blind sac without the formation of a portio (Fig. 1, text).

Symptoms.—The last-mentioned findings (ovaries) explain the fact that although sexual feelings are usually absent, they may occasionally be present. Furthermore, the most prominent symptom, viz., the non-occurrence of menstruation at the age of puberty, may be associated with the periodical onset of molimina menstrualia. If such individuals indulge in sexual intercourse, new symptoms are produced by the forced dilatation of the vaginal rudiment and often of the urethra (sometimes incontinence of urine) (Plate 61, Fig. 2).

Diagnosis.—Above all, the absence of the uterus must be determined by bimanual exploration (Plate 40, Fig. 1; Plate 61, Fig. 2). The rudimentary vagina and the rectum are utilized for this purpose, while counter-pressure is made by means of palpation from the abdominal walls, or by the introduction of a sound or the finger into the bladder after dilatation of the urethra (*vide* cystitis), or by tamponing the vagina. The appendages and their remains must also be looked for above the rudimentary vagina. Their discovery is by no means easy.

3 and 4. *The absence of the entire sexual apparatus* entails the sexlessness of the individual and may be unattended with other fatal or even notable malformations. The vulvar parts may be entirely absent

* Munich Gyn. Clinic, in a fœtus, Archiv f. Gyn., 37, 2.

or they may assume an hermaphroditic character (marked development of the clitoris and of the labia majora, which are joined together by a raphe; atrophy of the nymphæ, and shortening or atresia of the genital fissure). In the latter event, a careful examination occasionally shows the presence of sexual glands in the labia majora, so that the latter may not only assume the shape of a scrotum but may also contain testicles. This condition is known as pseudohermaphroditism.* True hermaphroditism indicates the occurrence of testicles and ovaries in the same individual. An ovary and a testicle may occur upon both sides or only upon one side, or one of these organs alone may be found upon each side (H. bilateralis, unilateralis, lateralis).

Treatment.—The restoration of the vagina when the uterus is absent is useless. Recognition of the condition and symptomatic treatment of the molimina menstrualia (narcotics and external derivatives, perhaps castration) are the objects of medical care. In hermaphroditism we must determine, as accurately as possible, the predominant sexual type, because it has repeatedly happened that the individual has been married or that an hermaphrodite has only become conscious of the real sex after marriage.

5. *Uterus unicornis* is due to the fact that one Müller's duct is not differentiated into the corresponding half of the uterus with its Fallopian tube or is

---

* The seminal glands are usually rudimentary ; the other sexual characteristics are those of the opposite sex. Gynandres : high degree of male hypospadias, including the scrotum ; atrophy of the penis ; testicles in the abdomen or inguinal canal. Viragines : adherent labia, enlarged clitoris ; menstrual hemorrhages.

only developed in a rudimentary condition. The uterus is correspondingly narrower, more pointed, and usually curved in the shape of a horn toward the

Fig. 2.—Uterus Unicornis Dexter; left half developed merely as a prolonged tube. Hymen septus (compare Fig. 1).

well-developed side. The muscular coat of the rudimentary side is also less developed (Fig. 2, text). The lowest grade is the uterus inæqualis ex impedita evolutione unius lateris.* The results so far as they

* In two fœtal cases I found that the round ligaments were not inserted into the utero-tubal angles but radiated toward the tubes. Both tubes and broad ligaments were of unequal length (Arch. f. Gyn., 37, 2).

concern pregnancy and parturition are described in
"Atlas of Obstet.," § 41.   Upon the rudimentary side
the tube and ovary may be entirely wanting or the
Fallopian canal consists of an undifferentiated tube,
which may be entirely or partially solid.   The extra-
uterine migration of the semen or ovum has been ob-
served in such cases.

The *diagnosis* involves the early recognition of preg-
nancy and especially its location, inasmuch as a gravid
rudimentary horn usually ruptures, and, on the other

FIG. 3.—Atresia Ani; congenital
recto-vaginal fistula (above the
hymen).

FIG. 4.—Hypospadias; posterior
wall of the urethra absent.

hand, it is easily mistaken for extra-uterine preg-
nancy (*vide* "Atlas of Obstet.," §§ 41 and 44–46).

6, 7, 8. Atresiæ occur in every part of the genital
apparatus.

(*a*) They may be explained as arrests of develop-
ment during an early embryonic period in which
Müller's ducts are still solid aggregations of cells;
such atresiæ usually involve a long piece of a tube
(see Plate 61, Fig. 2).

(*b*) Or at a somewhat later embryonic period (four
to six weeks), certain openings or involutions of one

hollow viscus into another remain absent, for example, atresia vulvæ, ani, or urethræ. These malformations may occur alone or we find, as further disturbances of arrested development, parts of the cloaca, *i.e.*, the embryonic canal which connects the bladder with the rectum and is closed externally. The external opening only forms after the recto-vesical septum grows downward, and, inasmuch as Müller's ducts sink with it, the perineum is gradually developed (Figs. 12-16, text). Traces of this period are found
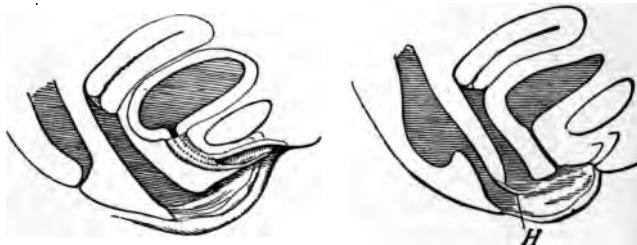
FIG. 5.—Epispadias (anterior wall of urethra absent, clitoris fissa).

FIG. 6.—Fistula Recto-vestibularis (hymenalis), with Congenital Atresia Ani.

in the above-mentioned atresiæ, combined with certain congenital fistulæ, for example, a fistulous canal (atresia ani vaginalis, Fig. 3, text) passing from the rectum to the posterior vaginal wall in atresia ani. Imperfect closures of the urethra are represented by female hypospadias (Fig. 4, text) and the rarer epispadias (Fig. 5, text). These are commonly associated with fissure of the clitoris and symphysis and with inversio (ectopia) vesicæ, *i.e.*, absence of the anterior wall of the bladder and exposure of the free posterior wall of the bladder.

(c) *Fistula recto-hymenalis seu vestibularis*, which opens into the vulva outside of the hymen, develops at a later embryonic period. It is the remains of the developmental period of the perineum (much later than the cloaca) from the urogenito-rectal septum and two lateral nodules which grow downward and coalesce with the former through the raphe perinealis (Fig. 6, text).

(d) A fourth group of atresiæ may develop in this or in a much later period of fœtal life in the shape of

FIG. 7.—Atresia Hymenalis, Hæmatokolpos, Hæmatometra, and Hæmatosalpinx (both ostia recognizable).
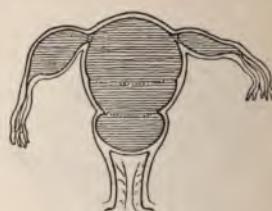
FIG. 8.—Atresia Vaginalis by a Transverse Membrane (both ostia recognizable). Partial hæmatokolpos, hæmatometra, and hæmatosalpinx on both sides.

inflammatory adhesions. These assume commonly a diaphragmatic character; for example, atresiæ of the vulva and hymen, occlusion of the vagina, cervix, and the orifices of the uterus in the shape of bridges of mucous membrane or transverse membranes. The atresiæ occur when the genitalia are single as well as in uterus bicornis (Plate 34, Fig. 3, and Figs. 7–11, text).

The *symptoms* of genital atresiæ are variable and begin at different periods of life. Every new-born babe should be examined carefully in reference to the

permeability of the urethra and anus. However self-
evident this may seem, it is often neglected. It is
not rare that anal atresiæ, and still more urethral atre-
siæ, are only discovered accidentally after the lapse
of a few days or as the result of retention symptoms.
Permeability of the hymen should also be looked for,
although this anomaly usually is not discovered until
the age of puberty. The state of matrimony is some-
times entered by women who, on account of atresia
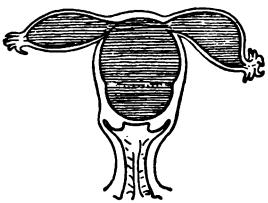
FIG. 9.—Atresia Cervicalis Uteri.
Hæmatometra, hæmatosalpinx
(internal os recognizable, ex-
ternal os free).
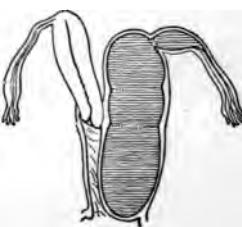
FIG. 10.—Atresia Hymenalis with
Double Uterus and Vagina; hæ-
matokolpos, hæmatometra, and
hæmatosalpinx of the left side
(both ostia recognizable).

of the hymen, have never menstruated and yet the
atresia had never been discovered.

The entire absence of menstruation is the cardinal
symptom of all genital atresiæ. Disturbances set
in only with the increasing distention of the genital
canal by mucus and menstrual blood. Hæmatokol-
pos, hæmatometra, and hæmatosalpinx develop, ac-
cording to the site of the occlusion. Their symptoms
are at first periodical, later there are constant pains
which exacerbate like labor pains; the blood sac gives
rise directly to interference with urination and defeca-
tion, and indirectly to indigestion, vomiting, etc. In

atresia of the uterus the accumulation of blood in the
tube occurs earlier than in hæmatokolpos (Plate 18,
Fig. 2).   It becomes dangerous on account of the fra-
gility of the walls and is a source of discomfort from
the inflammatory irritation of the peritoneum, due to
the escape of small quantities of blood from the orifice
of the tube.   The same dangers result from an accumu-
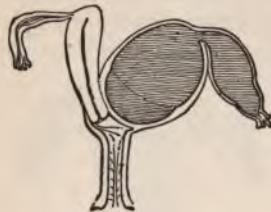
Fig. 11.—Atresia of the External
Orifice of Uterus Bicornis; left
hæmatometra and hæmatosal-
pinx.
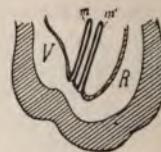
Fig. 12.—For the sake of sim-
plicity both of Müller's ducts
are drawn, one behind the
other (*m m'*).   They open in-
to the cloaca, which is closed
externally, and which unites
the bladder (allantois, V) and
rectum (R).   A shallow de-
pression indicates the devel-
oping anus; another indicates
the sinus urogenitalis.

lation of blood in the occluded rudimentary horn of
the uterus.   The danger is less in atresia of a com-
pletely double genital canal (uterus septus and vagina
septa) because the rupture of the blood sac into the
open genital canal is probable (Figs. 10 and 11, text).
But rupture of an atresic single genital canal gener-
ally occurs at a thin portion of the cervix, so that the
exudation takes place into the abdominal cavity (peri-
tonitis) or subperitoneally and then descends around
the vagina to the floor of the pelvis.

In *atresia ani vaginalis* defecation takes place
through the vaginal canal (Fig. 3, text).   If there is

a sphincter-like closure, the stool and gases are evac-
uated periodically. Otherwise, or when the opening
is situated too high in the vagina, the condition is
deplorable despite the most scrupulous cleanliness.
If the opening is too small or the intestine is flexed,
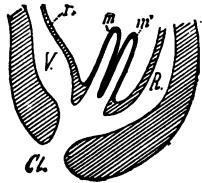
FIG. 13.—The open Müller's
canals have descended
with the recto-vesical sep-
tum, and terminate in the
open cloaca (P, perito-
neum).
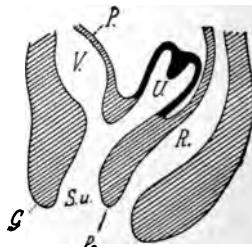
FIG. 14.—The Müller's canals have
united to form the uterus (U);
the septum still persists in the
fundus. Long urogenital sinus
(S.u). G = genital nodule = fu-
ture clitoris. Pe = perineum.
The urethra, which opens high
up, is still much larger than the
genital opening.

symptoms of inflammation and ileus make their ap-
pearance.

The same remarks hold good, *mutatis mutandis*, in
atresia ani vestibularis (Fig. 6, text).

Incontinence of urine is found in higher grades of
hypospadias and especially in epispadias (see **Figs.
4 and 5**, text).

Diagnosis.—In permanent absence of menstruation
ocular inspection is always necessary. In hymenal
and vaginal atresia (Figs. 7–11, text), the bluish
membrane is seen projecting like a bladder; in cervi-
cal atresia, the sound cannot be introduced into the

uterine cavity; in occlusion of the internal os, the cervix is intact, but is effaced in occlusion of the external os. In reduplication of the genital canal, only one can be sounded.

Palpation completes the picture. Through the rectum we feel, toward the bladder, a tense, elastic tumor upon which the body of the uterus is seated as a small, hard tumor. When still more dilated, the
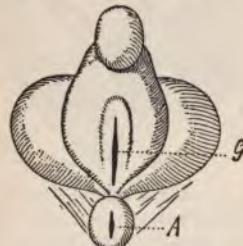
FIG. 15.—Behind the relatively large genital tubercle (clitoris) is the slit-shaped opening of the urogenital sinus (*G*); behind it is the anus (*A*). External appearances corresponding to Figs. 14 and 16.

FIG. 16.—Further Descent of the Urogenital Septum and consequent Shortening of the Urogenital Sinus (see below).

uterus retains the hour-glass shape on account of the resistance of the internal os. The tubes can then be palpated (cautiously) on the sides as tense, elastic sacs (Figs. 7–11, text).

Band-shaped atresiœ of the vagina are recognized by bimanual exploration (Plate 61, Fig. 2).

Treatment.—The gynatresic membranes must be opened forthwith, but the blood must be evacuated slowly in order to avoid the production of collapse. If the tubal sacs have ruptured, immediate evacuation of the blood by kœliotomy is indicated. Ab-

dominal section should also be performed in order to remove the atresic hæmatometra of a rudimentary horn. In double uterus or vagina (by septum) it is better to excise the entire septum rather than to make a mere incision.

If the vagina is entirely absent (Plate 61, Fig. 2),
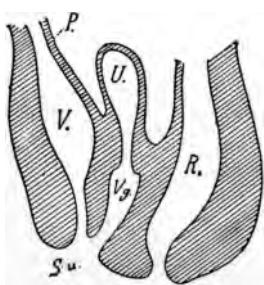
FIG. 17. — In the fifth fœtal month the portio vaginalis and cervical portion of the uterus are differentiated from the vagina (*Vg*). The urethra is easily differentiated from the bladder. The vesico-vaginal septum forms part of the vestibule.
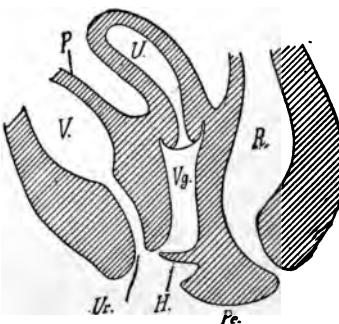
FIG. 18. — Schematic Representation of the Developed Genitalia after Formation of the Hymen (*H*).

i.e., if it exhibits band-shaped atresia, an artificial vagina is made, after introduction of sounds into the bladder and rectum, by passing carefully upward in the connective tissue between the two organs. Decomposition of the tarry blood is to be prevented by antiseptic compresses, and cicatricial closure of the new vaginal canal by a plastic operation. If closure takes place despite such operation, the ovaries should be removed by kœliotomy and the uterus stitched to

the vulvar wound in order to avoid a possible hydro-
metra.

Urethral fissures are closed by plastic operation.
Fistulæ in atresia ani vaginalis and vestibularis heal
spontaneously or after slight cauterization; or they
are split and then heal after the rectum has been
drawn down into its natural position as far as possi-
ble and provided with an anus by means of an opera-
tion from the perineum.

§ 2. HYPERPLASTIC MALFORMATIONS OF THE FŒTUS.

1. Reduplication of entire organs:
(*a*) Of the entire genital tract.
(*α*) Uterus didelphys, *i.e.*, uterus and vagina grow
separately as two Müller's ducts (Figs. 12 and 13,
text) without further differentiation, *i.e.*, either as two
solid strands or as two hollow canals terminating in
blind extremities.

(*β*) Uterus et vagina duplex, *i.e.*, two genital
tracts, each of which is differentiated completely into
a uterus and vagina (Fig. 19); as a matter of course
each tract has but one tube and ovary.

These two malformations occur only in those mon-
sters which are non-viable on account of other notable
malformations.   In the Munich Gynecological Clinic
I found two cases belonging to type *α*, associated with
ectopia viscerum and total absence of the bladder
and kidneys, cloaca formation, etc.; also a case of
type *β*, combined with umbilical hernia, eventration
of all the viscera, and atresia ani.   The occasional re-
duplication of the vulvar parts has no practical sig-
nificance (see *Arch. f. Gyn.*, 37, 2).

(*b*) Of the uterine appendages (ovaries, tubes) due to fission of the "*anlage*." This untranslatable word refers to the fœtal condition of any of the organs.

(*c*) Of the uterus: bicornis (Plate 9, Fig. 2, and

FIG. 19.—(Specimen from the Heidelberg Gynæcological Clinic.) Uterus bicornis bicollis with a single vagina.

Fig. 19 in the text), *i.e.*, the uterus has two horns, owing to the fact that those parts of Müller's ducts which usually form the corpus uteri do not coalesce

but develop separately, starting from a common cervix. This malformation may be associated with the following one. In the slightest grades the fundus is

Fig. 20.—Vagina Septa with an Atresic Canal (Munich Gynecological Clinic, *Arch. f. Gyn.*, 37, 2).

merely incurvated, hence is called uterus introrsum arcuatus.

2. Reduplication by a septum is due to the fact that, while Müller's ducts are applied to one another the septum between them is not absorbed (Figs. 14–17). This process begins normally between the eighth and twelfth weeks, in that part of the canal in which

the portio vaginalis develops during the twentieth to thirtieth weeks. Hence all varieties of double horns may be associated with all grades of septum formation in the uterus and vagina. Thus there may be uterus bicornis septus or bicollis and subseptus or unicollis, and both may or may not be associated

Fig. 21.—Uterus and Vagina Septa (Munich Gynecological Clinic).

with vagina septa or subsepta (Plate 9, Fig. 2, and Figs. 20–21 in the text). As mentioned above (§ 1), the single tube may be atresic (Figs. 10 and 11, text).

There is also a hymen septus or bifenestratus, which may become important in the pathology of sexual life on account of its firm resistance (Fig. 2, text).

Symptoms.—In "Atlas of Obst.," § 41, I have described the effect of these malformations upon labor. Very often conception does not take place as a result of the slight development of the genitalia.

7

Amenorrhœa is then usually present in the individual, who is also otherwise feeble. Marriage should be forbidden in such cases.

Treatment.—Ligature or division (Paquelin) of the septa. In castration, on account of myomatous hemorrhages or in total extirpation of the uterus, the possibility of failure or of an abdominal pregnancy is to be borne in mind, as the result of the possible presence of a third ovary.

CHAPTER II.

ARRESTS OF DEVELOPMENT AND MALFORMATIONS OF THE PERIODS OF INFANCY AND PUBERTY.

1. Uterus fœtalis (often planifundalis);
2. Uterus infantilis and uterus membranaceus;
3. Anteflexio uteri infantilis;
4. Stenosis cervicis et orificii externi;
5. Stenosis vulvo-vaginalis s. hymenalis;
6. Evolutio præcox;
7. Oligorrhœa and amenorrhœa;
8. Dysmenorrhœa;
9. Menorrhagia;
10. Sterility.

§ 3. INFANTILE MALFORMATIONS.

1, 2. The arrests of development known as fœtal or infantile uterus are associated with functional disorders (which are described under 3–8) and with general feeble constitution, idiocy, etc. In the fœtal form the growth of the body of the uterus is checked

so that the cervix is relatively larger; the portio vagi-
nalis uteri is very small and is provided with a very
minute opening. The latter is also true of the infan-
tile uterus (Plate 9, Fig. 1), but the corpus is de-
veloped to such an extent that the muscular coat is as
thick as the cervix. But the body is situated on the
neck like a co-ordinate prolongation of the latter,

rather than as a large, pyriform
principal part. Uterus membra-
naceus (Fig. 22, text) exhibits sim-
ple primary atrophy of the organ.
In all three forms the organs are
small. The diagnosis is made by
bimanual exploration, if necessary
through the rectum, and by the care-
ful introduction of the uterine
sound.*

Fig. 22.—Uterus Mem-
branaceus.

Treatment.—Relief of anæmia and
tuberculosis by the use of tonics.
Improvement of the local circulation
by massage, warm sitz-baths, irri-
tant vaginal injections, and intra-
uterine stem pessaries, frequent
scarifications, sinapisms to the thighs during the
menstrual molimina, faradization by means of the
intra-uterine sound, with the other pole placed on
the mons veneris.

3, 4. *Infantile anteflexion* (Plate 34, Fig. 3), when
the uterus is small, is often associated with stenosis
of the cervical canal or os uteri. Another variety,
puerile anteflexion, consists of forward flexion of a

* The normal length of the uterus, measured by the sound, is
6 cm.

normally large, flexible organ, with a shortened anterior vaginal wall, in whose prolonged axis lies the narrow, hypertrophic cervix.

Symptoms.—Dysmenorrhœa (*vide* 8) and sterility are the chief symptoms. Both may be purely mechanical in origin, *i.e.*, they are due to the narrowness of the canal or to the angle of flexion, especially when the canal has become rigid from secondary inflammatory processes and the organ has lost its flexibility. But the most frequent cause is the passive congestion, with the gradually resulting proliferating endometritis; the frequent hypoplasia is also a cause of sterility.

Diagnosis.—The anteflexion is determined bimanually, after evacuation of the bladder (Plate 40, Fig. 1); the shape and direction of the vaginal portion must also be noted. The sound controls the direction and also ascertains the narrowness of the cervix,* whether it is narrowed *in toto* or only at one of the two orifices, and whether there is secondary dilatation of the uterine cavity or the cervical canal (Plate 34, Fig. 3).

Treatment.—For relief of the stenosis (provided there is no other cause of the symptoms, such as, for example, endometritis) we urge dilatation by metallic dilators, laminaria tents or iodoform gauze tampons, better still bilateral incisions (about 1 cm. deep) of the commissures of the os by the aid of Cowper's scissors immediately after menstruation; sutures are then applied in a lateral direction to unite the cervical mucous membrane with that of the por-

---

* The normal cervical canal permits the passage of a sound 4 mm. in thickness.

tio vaginalis; when the os gapes, the line of sutures runs from the anterior to the posterior lip. As the raw surfaces are apt to reunite after this operation (Sims), it is preferable to make four radiating incisions (Kehrer), then tampon with ferric chloride cotton. In stenosis of the entire cervical canal we recommend faradization with the sound (negative pole) in the canal, using fifty milliampères.

In order to relieve the anteflexion we may resort to the application of the intra-uterine tent, a short, sound-like rod of whalebone (2–3 mm. thick and 1–1½ cm. shorter than the uterine cavity) with a horn plate, 2–2½ cm. in diameter. If it cannot be inserted directly, the uterus is first straightened with the aid of a sound and the tent applied alongside the latter. Fixation for a few days by means of a cotton tampon and rest in bed are then secured. The tent must be removed as soon as pain indicates inflammatory reaction.

The tent is intended not alone to relieve the flexion, but experience also teaches that it has a favorable influence on the dysmenorrhœa and sterility. It also exerts a favorable stimulant action on the organ. Its introduction should be repeated every few months; antiseptic vaginal irrigations should be made.

5. Stenosis vulvo-vaginalis or hymenalis. It is only in the higher grades of vagina infantilis that incisions are necessary, but in such cases a transplantation flap must also be inserted. A firm hymen, which interferes with coitus, must be incised and sutured with catgut, as serious hemorrhage may occur from lateral ruptures in forced immissio penis or during labor. In slighter grades the vagina may

be dilated, either forcibly, or slowly with iodoform gauze.

§ 4. Menstrual Anomalies.

Physiological menstruation occurs as a sign of sexual maturity at the age of puberty (fourteen to sixteen years in our climate, earlier in warmer regions; earlier in large cities than in the country) in the shape of a hemorrhage, as the result of a regular monthly congestion of the genitalia, attended by maturation and detachment of an ovum from the ovary (rupture of a Graafian follicle = ovulation). The object of this process is to prepare the uterine mucous membrane, by congestion, for the reception and further nutrition of an impregnated ovum. The entire process (ovulation and menstruation) is regulated centrally. The site of the hemorrhage is the mucous membrane of the body of the uterus, if pregnancy does not ensue.

Menstruation is often associated with preliminary or accompanying disorders: eruptions (herpes labialis, acne), itching, chills, neuralgia, a tired feeling, vertigo, borborygmus, diarrhœa followed by sudden constipation, leucorrhœa for a couple of days in advance, more frequent micturition.

6. In *evolutio præcox* menstruation occurs during childhood with coincident completion of sexual maturity. (Not infrequently hemorrhages from the genitalia of the new-born are falsely regarded as menstruation.) If such individuals, whose entire physique (mammæ, hairy growth) is that of adults, become pregnant, parturition generally runs its course without notable difficulty.

7. *Oligorrhœa and Amenorrhœa.* — *Etiology.* — In §§ 1–3 we find a number of causes of amenorrhœa in the malformations of the genitalia. These may be divided into: (*a*) permanent organic causes: defects of the uterus, ovaries, or Graafian follicles (either congenital or as the result of oöphoritides before puberty) with otherwise complete development of the genitalia; (*b*) functional disorders which do not persist in every case: infantile genitalia (small size, anteflexion, stenosis, imperfectly developed mucosa), anæmia (insufficient degree of uterine hyperæmia); (*c*) mechanical, removable obstructions, atresiæ; (*d*) causes of secondary amenorrhœa: constitutional diseases (sometimes also morphinism, obesity), severe acute diseases, profound emotional disturbances (fright, fear of pregnancy), diseases of the genitalia, such as metritides (shrinking of the mucous membrane), perimetritides (ovaries embedded in exudates, orifices of the tubes surrounded by exudates) and oöphoritides, ovarian tumors, puerperal hyperinvolution (atrophy of the genitalia), finally as a physiological process, pregnancy (it is to be noted here that ovulation and conception may occur despite amenorrhœa).

Treatment. — It is indispensable to ascertain whether the condition is a true amenorrhœa, *i.e.*, whether there is not a mechanical obstruction to the escape of blood. In such an event the atresia must be relieved (§ 1 and Plate 31).

Then we must exclude, by exploration, the forms described above under *a* and which are subjected to the symptomatic treatment described in § 1.

Group *b* requires prolonged treatment, which is

often successful when carried out persistently (see §
3).   The cardinal point is the regulation of the entire
mode of life in order to strengthen the patient.

All noxious influences must be prevented, such as
over-exertion, especially of a mental character (exces-
sive study, embroidery, frequent visits to theatres and
balls, etc.), too little or too much sleep, exhausting
vital losses (diarrhœa, leucorrhœa, the results of
masturbation), improper food, etc.

We may recommend at first a mild, non-constipat-
ing diet, then a meat diet, regular housework, if pos-
sible in the country, one to two hours' walk daily,
provided it does not cause exhaustion, regulation of
the bowels (ingestion of fruits, enemata of lukewarm
water with or without soap, oil, mild laxatives).
Valuable aid is derived from the administration of
Hommel's hæmatogen (Liq. hæmoglobin) or Dah-
men's hæmalbumin powder, iron peptonate wine,
Blaud's pills, etc.

The circulation of blood may be regulated by warm
foot-baths (95°–99.5° F. with a few tablespoonfuls of
salt or mustard, once or twice a day) or warm sitz-
baths or full baths, and the application of sinapisms
to the thighs at times when the congestion of the pel-
vic organs and a mucous discharge indicate the onset
of menstruation.   On the other hand, cool baths and
river bathing are contraindicated.   Among the spas
Wildbad, Pyrmont, Driburg, Schwalbach, Schlan-
genbad, and St. Moritz may be recommended.

The Weir Mitchell-Playfair rest cure is indicated
in very nervous, anæmic girls.

The local treatment is described in § 3; emphasis
may be laid here upon the use of massage.

The treatment of group *d* corresponds to that of the individual primary disease. Hyperinvolution is treated by massage and faradism (see § 3, stenosis).

A series of sequelæ of amenorrhœa must be treated:

1. Vicarious hemorrhages (hæmoptysis, hæmatemesis, hemorrhoids) from other mucous membranes (hemorrhages from the kidneys, bladder, skin, nose, eyelids, anterior chamber of the eye, ears, lips, cicatrices). But it is usually difficult to decide whether these are the results or the cause of the amenorrhœa, especially if they do not occur with strict periodicity.

2. Cutaneous eruptions: erythematous, impetiginous, herpetic (especially at the border of the lips), and pustular (acne).

Treatment of acne: Apply Kummerfeld's lotion, Lassar's paste, sulphur ointment, and give pills of ammonia caustica (0.1 in dragées). Treatment of urticaria and erythema: give laxatives, salicylic alcohol, atropine, or salicylate of soda (6–8 gm. daily). Treatment of impetiginous eczema (pustules with a honey-yellow crust): apply unguentum diachyli, vaseline, or Wilson's unguentum zinci benzoati or bismuth ointment.

3. Neuroses (also periodical). These include neuralgia, palpitation of the heart, congestive flushes to the head, dyspnœa (uterine asthma), stomach cramp, digestive disturbances, etc.

Treatment of neuralgias and asthma: caffeine, antipyrin, inhalations of chloroform, infusion of digitalis, and ice-bags to the præcordium.

8. *Dysmenorrhœa* is characterized by violent uterine pains which give rise to reflex nausea, vomiting, dizziness, and syncope.

Etiologically seven varieties may be distinguished:

(*a*) Reflex dysmenorrhœa: in diseases of the ovaries, tubes, perimetrium, etc.

(*b*) In the initial stage of intramural myomata.

(*c*) Neuralgia uteri, due to fright, interrupted coitus, masturbation, mechanical irritation.

(*d*) Congestive dysmenorrhœa: in uterine flexions, and in all conditions which induce hyperæmia of the organ. The pain precedes the flow of blood and subsides when the latter appears.

(*e*) Inflammatory dysmenorrhœa: in endometritis, metritis, parametritis, and perimetritis. Here the pain is most severe at the beginning of menstruation and slowly subsides. The uterus itself is very tender. In the most severe forms shreds of mucous membrane are exfoliated and occasionally the entire mucosa comes away as a triangular patch. Hence the condition is known as dysmenorrhœa membranacea in endometritis exfoliativa.

(*f*) Mechanical obstructive dysmenorrhœa, often preliminary to the former variety (see §§ 3 and 4, Amenorrhœa), either from too rapid and abundant flow of blood or from stenosis or flexion of the cervix. The pains resemble labor pains. Thick coagula or shreds of mucous membrane are passed.

(*g*) Exfoliatio mucosæ menstrualis or dysmenorrhœa membranacea without endometritis.

Diagnosis and Treatment.—(*a*) In every dysmenorrhœa the condition of the entire genital tract must be determined by accurate bimanual examination and exploration with the sound, and the general constitution must also be considered.

(*b*) Small intramural myomata cannot be recog-

nized until they begin to push the uterine walls forward or give rise to a demonstrable change of consistence. A characteristic symptom is violent, boring, fixed pain without fever. The pains may be relieved by suppositories or injections of chloral hydrate, extract of belladonna, hyoscyamus, or antipyrin. We may order cutaneous derivatives (sinapisms, compresses of camphor and alcohol), ergotin and mud baths at home or in Kreuznach, Toelz, and Hall. The patient should stay in bed during the attacks.

(c) Potassium bromide, antipyrin, and the derivatives just mentioned are indicated in the cases referred to under c.

(d) Rest in bed, warm covering on the abdomen, hot hand-baths, and cutaneous derivation are useful in the congestive variety. Laxatives and ipecacuanha to relieve distention of the stomach and catarrh are also indicated. Scarifications or two leeches to the portio vaginalis may be employed to relieve the local congestion.

Later, the narcotics recommended under b may be employed to relieve the pains. The causal changes must be treated; flexions by means of pessaries, massage, etc., and stenoses with the aid of laminaria and tupelo tents.

(e) Relief of the inflammations. The attacks are treated as in d, especially by abstraction of blood (two leeches) and laxatives, scarifications of the cervical mucosa, wedge-shaped incision (vide Metritis).

(f) See the treatment of stenosis and amenorrhœa in §§ 3 and 4. The pains develop after the beginning of menstruation.

(g) According to v. Winckel the repeated applica-

tion of two leeches to the portio prevented the exfoliation of the decidua menstrualis and resulted in conception and recovery. Trial may be made of curetting and cauterization (ferric chloride, zinc chloride). Symptomatic treatment is the same as in *b* and *d*.

A feeling of heat and cold, nausea, vomiting, dizziness, headache, syncope, occur as prodromata, with or without hysterical convulsions. Circumscribed pain is felt in the abdomen. The loss of blood may be slight.

The above-mentioned membrane is evacuated with or without pain; when complete, it is a triangular sac or flap with the three uterine openings (tubes, internal os). The outer surface is rough and tattered, the inner surface smooth, with furrows and punctate glandular openings. Microscopic structure of decidua menstrualis: connective tissue with numerous small round cells, which do not conceal the former; transverse sections and openings of utricular glands with cylindrical epithelium and blood-vessels. A few scattered large cells. In kolpitis exfoliativa membranes may be exfoliated from the vagina, consisting of polygonal pavement epithelium with a relatively small vesicular nucleus (see Plate 8, Figs. 1 and 3).

Microscopical differential diagnosis (see "Atlas of Obst.," Figs. 58, 121, 124, 126, 127). The decidua vera of pregnancy consists of large, irregularly rounded cells with large, often multiple nuclei. The scanty connective tissue is entirely hidden by the cells.

9. *Menorrhagia.*—This term refers to uterine hemorrhages which constitute excessive menstruation in

comparison with the general condition. Hence symptoms of anæmia develop or are intensified in those already anæmic (vertigo, syncope, ringing in the ears, nausea, vomiting, constipation, pallor of the mucous membranes, shortness of breath, etc.). The menorrhagia may be habitual or temporary.

Etiology.—(*a*) Genital diseases: tumors, displacements, and inflammations; (*b*) diseases of other organs which induce circulatory disturbances (heart, lungs, kidneys, spleen, liver); (*c*) combined with intestinal diseases (dysentery, constipation); (*d*) nervous hyperæmias (emotional excitement, heating drinks); (*e*) combined with constitutional diseases (Werlhof's disease, excessive development of the panniculus adiposus).

Treatment.—Symptomatic treatment consists of rest in the horizontal position, bland diet, soothing drinks (acids, effervescent powders).

In regard to genital diseases (Group *a*), see the treatment of endometritides, chronic metritis in the stage of congestion, parametritides and perimetritides (fibrous and mucous polypi of the uterus, sarcoma and carcinoma, ovarian tumors), flexion and prolapse of the uterus.

Until radical treatment is adopted, the hemorrhage is treated with ergotin and secale cornutum, hydrastis canadensis, hot vaginal irrigation (113°–126° F.) at intervals of three to six hours, or very firm vaginal tampons (iodoform gauze or salicylated cotton). If necessary the cervix may be tamponed with iodoform gauze or laminaria.

Liquor ferri sesquichloridi may be used as a local hæmostatic, either applied upon cotton or the armed

sound may be kept in the cervix for two to three hours. I found that ferripyrin is a good hæmostatic, without any caustic action.

In Group *b* a specific action is obtained from the use of digitalis, expectorants, and the waters of Carlsbad, Wildungen, Neuenahr, Vichy.

In Group *c* we may rely on the administration of laxatives (infusion of senna as enema, strong infusion of rhubarb, castor oil).

In Group *d*, see Dysmenorrhœa.

In Group *e* employ local hæmostasis as in *a* and ergotin, combined with the treatment of obesity by the methods of Banting, Epstein, and Oertel.

§ 5. STERILITY.

The causes of sterility may be found in the purely physical or psychical constitution of the husband or wife or in habitual disease of the fœtus. They may be divided into four groups:

1. Impotentia coëundi from organic defect or nervous or psychical influences.

Male.—Epispadias and hypospadias; paresis or paralysis of the nervi erigentes as the result of psychical influence or nervous weakness (diseases of the brain and cord, age, bad habits, etc.); aspermatism from cicatricial stenosis; prostatic hypertrophy.

Female.—Atresia or stenosis of the hymen or vagina; vaginismus; obstructing tumors or inflammations; absence of sexual desire.

2. Azoospermia or inhibited development of the ovum.

Atrophy of the testicle (by gonorrhœal orchitis, injury, etc.); atresia of the ejaculatory ducts.

Inhibited rupture of the follicles, either congenital or from oöphoritis; ovarian tumors.

3. The semen does not reach the ovum within the female genitalia.

Atresia or stenosis of the uterus or tubes (flexions of both); tough cervical plug (endometritis); uterine or tubal tumors; tubal atresiæ and perioöphoritic• false membranes.

4. The ovum does not adhere to the uterine mucosa.

Endometritis; uterine tumors; weakness; diseases of the ovum.

Examination.

Male.—As gonorrhœa is a frequent cause of azo-ospermia and of cicatricial stenosis, the previous and present clinical history must determine whether a stricture is present and whether the semen contains spermatozoa of normal shape and number.

Female (see §§ 1-4).— Character of the menses; the presence of leucorrhœa or gonococci; examination of uterus with speculum and sound; bimanual exploration of uterus and appendages.

The *treatment* corresponds to the various findings. If no cause is found we should advise that the legs be held firmly together and the semen kept in the vagina as long as possible. Sims ascertained that the posterior fornix acted as a receptaculum seminis for the portio vaginalis, which dips into this part in the normal position of the uterus. Coitus should be performed when the woman's pelvis is raised or *a posterioribus.*

PART II.

Changes in Shape and Position.

CHAPTER I.

HERNIÆ.

Abdominal organs are apt to be invaginated in natural canals in the superincumbent and least resistant soft parts. Herniæ, therefore, are met with on the abdominal wall, in the gluteal region, along the sheath of the femoral vessels, in the vagina, and in the labia. For vaginal herniæ see § 7, under Inversion of the Vagina.

§ 6. HERNIÆ AND OTHER CHANGES OF FORM OF THE VULVA.

The hernia may contain the uterus, or one of its horns in uterus bicornis (see "Atlas of Obstetrics," Fig. 35, and § 36, hernia of the gravid horn) and its adnexa (ovary, see § 1, pseudo-hermaphroditism), with or without the intestines and their appendages or the latter alone.

The passage most frequently taken is through the inguinal canal (Plate 4, Fig. 1), more rarely that in front of the broad ligament along the levator ani muscle. In the former case we have a hernia inguinalis (anterior); in the latter, hernia vaginalis labialis

(posterior).   The hernial sacs may be as large as a melon.

Diagnosis.—This is based on the varying degree of fulness and the possibility of replacing the organs in the sac; its contents, usually fluid or gaseous; or it has the characteristic form and sensibility to pressure of the ovary; and protrusion on straining.

Treatment.—The same as in other herniæ—taxis and retention by a pad (Scarpa) or a large hollow vaginal pessary of hard rubber; incision of the hernial sac, or when irreducible through the original passage kœliotomy and internal fixation by suture, with closure of the hernial opening.

Other changes in form are reduplication and enlargement of certain parts, *e.g.*, the nymphæ, clitoris, etc., which may give rise to irritation, excoriation, œdema, etc.

Treatment.—Frequent local ablutions with astringent solutions, and cataplasms, *e.g.*, with decoctions of oak bark or lead water; borated vaseline, sitz-baths with bran, dermatol; the application of strong cocaine solution to allay irritation.

CHAPTER II.

INVERSION, DESCENSUS, AND PROLAPSUS.

Inversion and prolapse bear a certain relation to each other; the former predisposes to the latter. The inverted vagina easily drags the uterus along with it to the vulva; the same cause, however, may underlie both conditions.   Inversion of the uterus

8

is liable to be followed by descent and complete pro-
lapse of the organ outside the vulva.   On the other
hand prolapse of the uterus, and even prolapse sim-
ulated by hypertrophy of the cervix, may lead to in-
version of the vaginal mucosa.

§ 7. Inversion of Vagina and Uterus.

(Plates 4, 21, 22, 25, 64.)

Inversion of the vagina usually leads to the forma-
tion of herniæ; the most frequent being the posterior
portion of the bladder (cystocele, Plate 22, Fig. 4)
and the anterior wall of the rectum (rectocele, Plate
22, Fig. 3).   Other organs are rarely turned into the
vagina, sometimes from the posterior or anterior peri-
toneal excavation, sometimes from the parametrium
or the paravaginal space.   In the "Atlas of Obstet-
rics," Figs. 85 to 88, §§ 23, 24, cases are reported of
incarcerated retroflexed gravid uterus and of ectopic
pregnancy, in which the ovisacs protruded into the
vaginal wall.

Among the rarer forms are ovariocele, enterocele
(Plate 61, Fig. 1), hydrokolpocele, pyokolpocele
(Plate 43, Fig. 3), and protrusions of the vaginal ,
walls by tumors of Douglas' sac (Plates 42 and 43,
and "Atlas of Obstetrics," Figs 97 and 98) or of the
vesico-vaginal and recto-vaginal septa (Plate 42, Fig.
1; Plate 57, Figs. 5 and 6).

If an ovary or a loop of the intestine (with omen-
tum) descends into Douglas' sac and is fixed, it
may bulge out the vaginal wall (especially if the
uterus is retroflexed or prolapsed) or in extreme cases
protrude beyond the vulva.   It is evident that in this

way herniæ of the posterior and anterior vaginal walls may follow, there being equal pressure in the recto-uterine and vesico-uterine excavations.

Protrusions are sometimes caused by ascites when the uterus is retroflexed or placed vertically, but more often by pus in cases of encapsulated peritoneal exudation (pyokolpocele).

Diagnosis (see remarks on differential diagnosis of tumors in Douglas' sac, *infra*).

Ovariocele is recognized on bimanual palpation by its form, sensitiveness on pressure, and its position with reference to the tube and uterus. But if the organ is enlarged or embedded in masses of exudate, all differential diagnostic factors must be taken into consideration.

Enterocele is diagnosticated by the same signs as other intestinal herniæ; in these cases, too, the size of the sac is influenced by coughing and straining.

Hydrokolpocele and pyokolpocele are recognized by the well-known symptoms indicative of ascites and peritonitis (see these).

Prognosis and Treatment.—Enterocele is likely to cause trouble only during labor, and should be reduced preferably from the rectum. Kolporrhaphy may be necessary.

An incarcerated ovary may be replaced with the patient either in the lateral or in the knee-elbow position, the difficulty depending upon the adhesions. Serious consequences may result from ovarian tumors and pregnancy or labor (see "Atlas of Obstetrics," §§ 37, 40; Fig. 97). Should reduction fail under such circumstances, the tumor must be diminished in size by means of a trocar or removed through the vagina.

Prognosis and treatment of hydrokolpocele and pyokolpocele depend upon the causative disease. In certain cases aspiration through the vagina may be required.

Inversion of the posterior vaginal wall may lead to rectocele, but as the two organs are united only by loose connective tissue this displacement does not always occur; in most cases the rectum is primarily implicated. Usually relaxation of the vaginal walls, a patulous vulvar cleft (with or without laceration of the perineum), and prolapsus of the uterus are found. The rectocele is recognized by the examining finger as a pocket (Plate 22, Fig. 3; Plate 23, Figs. 1 and 2; Plate 27, Fig. 2), causing constipation and tenesmus.

Treatment.—Restoration of the perineum and shortening and narrowing of the vaginal canal (see the operation under "Prolapse of the Uterus") must be carried out. When the muscular structure of the vagina is relaxed by kolpitis, astringents are indicated in the form of injections, tampons, or suppositories. Pessaries are at best but a temporary expedient.

Much more frequently a cystocele follows upon inversion of the anterior vaginal wall, because the two structures are firmly united and the intra-abdominal pressure forces the bladder to descend after the vaginal wall. The bladder is divided into two bulging portions, one of which is situated behind the symphysis and the other in the inverted sac, and drags the urethra with it in a double curve like the letter S. Accordingly the catheter may be introduced through the urethra into the sac, since the concavity is directed downward (compare Plate 22, Figs. 2 and

4; Plate 23, Fig. 3; Plate 24, Figs. 1, 2, 4; Plates 29 and 30 [sounding by catheter]; Plate 32, and "Atlas of Obstetrics, § 39, condition during labor).

The circulatory disturbances produced in the inverted parts sometimes cause dysuria, which, with the inability to empty the bladder completely, leads to catarrh of that organ, cystitis, and the formation of calculi.

Treatment as above.

Inversion of the Uterus.

This is a far more serious condition, but it arises under very similar circumstances. The chief etiological factor of this affection is relaxation and dilatation, both of the body of the uterus and of the cervical walls and the os. Another cause is most frequently an acute puerperal one (precipitate labor, forced Credé manipulation, traction on the funis), or a chronic one in the form of dragging produced by a fibrous uterine polyp, during the delivery of which the fundus descends along with it and passes through the cervix. Should such a tumor be submucous, it inverts the mucous membrane only; if it be intramural, the muscular coat is likewise involved, or it drags along also the peritoneal investment and thus forms a peritoneal pocket which may contain (only in puerperal inversion) the adnexa or coils of intestine (Kehrer). In time these become glued together by adhesions (see Plate 21, Fig. 2; Plate 22, Fig. 1).

There are various grades of inversion: complete, including the cervix as far as the external os; complete with inverted vagina, i.e., inversio uteri cum prolapso; incomplete as far as the internal os. The

slightest degree is that in which there is depression of the fundus uteri (see Plate 21, Figs. 1 to 4; Plate 22, Fig. 1; Plate 25, Fig. 2). Acute puerperal inversion may persist permanently.

Symptoms.—Owing to the constriction, the mucosa swells, proliferates, and bleeds readily; the decubitus gives rise to ulcers which may adhere to the vaginal mucosa. Gangrene may ensue. Acute puerperal inversion is associated with severe symptoms, shock, etc.

Pain and hemorrhages, being the main symptoms, vary in different cases and depend upon the condition of the tumors; the sequelæ are invalidism and anæmia.

Diagnosis.—Inverted uteri have been repeatedly ablated by mistake for a polypus.

In complete inversion with prolapse we find a readily bleeding, red, firmly elastic tumor, sensitive to the touch and on which we may sometimes be able to recognize the two uterine orifices of the tubes.

In incomplete inversion the sound may be passed along the tumor (corpus uteri) for some distance into the uterus (cervix) and more deeply in front than behind (3 to 4 cm.). Of importance is bimanual examination. It demonstrates the abnormal position of the uterus, and in its place the presence of the peritoneal pocket.

Treatment.—When a tumor is present, it should be enucleated; the uterus then usually becomes spontaneously replaced. When the uterus is irreducible by reason of great proliferative thickening of its walls, it should be amputated close to the external os, the peritoneal investment being carefully sutured.

Acute puerperal inversion requires manual reposi-

tion, and, as in the case of phimosis, the attempt
should first be made to push back the portion of the
cervical wall which adjoins the external os, bimanual
counter-pressure being made through the abdominal
walls lest the vagina be too much stretched and con-
tracted or torn.

If the attempt fail, then after disinfection the uterus
is pressed back by means of the colpeurynter, which
should be steadily refilled or by cotton tampons
coated with astringents. The pressure must be
strong and continuous until the uterus has partly
slipped back into the cervix. The injection of cold
water completes the reinversion and ergot will cause
the uterus to contract. Massage of the uterus effect-
ively aids the action of the colpeurynter.

Owing to the hemorrhages, an inversion of long
standing requires irrigations with hot water (115° to
126.5° F.) several times daily, and the attempts at
reposition should be repeated.

Kœliotomy is indicated only when the patient is *in
extremis*. Küstner's method is the best. In order to
incise the posterior uterine wall through its entire
length from the abdominal cavity, he makes a trans-
verse incision through the posterior vaginal vault;
reinversion of the fundus, etc., follows.

§ 8. PROLAPSE OF THE VAGINA AND UTERUS.

When the external os passes below the interspinous
line, the condition is called descensus of the uterus.
When the descensus of the cervix is associated with
inversion of the lower part of the vagina beyond the
vulva, the condition represents an incomplete or par-
tial prolapse of the vagina; it is complete when the

vaginal vault is likewise prolapsed. In like manner
the protrusion of the vaginal portion or cervix beyond
the vulva is called incomplete prolapse of the uterus;
in complete prolapse of the uterus, the entire organ
—with totally inverted vagina and cystocele, or recto-
cele, or both—lies outside the introitus vaginæ.

The prolapsed portions of the mucous membrane
of the vagina and the infravaginal cervix become on
the one hand easily excoriated (Plate 30) and on the
other hand they acquire a covering of a thickened
epithelial layer with superficial cornification (see
Plate 5, Fig. 2). The lips of the os are ectropic
(Plates 26 and 27, Fig. 1, and Plate 28). The introi-
tus (about 1 to 2 cm. of the vagina) remains *in situ*
even in extreme cases and forms a tumid ring (Plate
29) around the prolapsed tumor, which consists of
the vagina and uterus, perhaps with protrusions of
the bladder and rectum. These protrusions form
pockets for the retention of urine or fæces, and may
cause concretions and catarrhs, as the urethra is usu-
ally flexed at the same time. If the diverticulum is
formed by the entire lower and posterior half of the
bladder, sometimes including the vertex of the blad-
der and the vesico-uterine excavation (Plate 21), then
the ureters will be flexed and may give rise to hydro-
nephrosis. The predisposition to this condition as
well as to prolapsus in general is furnished by retro-
version of the uterus, especially when it is combined
with lacerated perineum (lack of support for the va-
ginal walls) and descensus of the uterus (see Plate 23,
Figs. 1 and 2; Plate 29; Plate 33, Fig. 3; Plate 61,
Fig. 1). As Douglas' pouch lies immediately above
the posterior vaginal vault, it also sinks down (Plate

23, Fig. 3, and Plate 24, Fig. 2) and carries with it loops of intestine.

These conditions easily explain the symptoms: there is the annoying sensation of the descended organ (as if it were about to fall out) during standing and walking; in other cases the entirely prolapsed round body interferes with walking; friction makes it and the thighs painful and sore. The mucosa of the vagina and the cervix suffers inflammatory irritation and consequently its secretion is not only mucous and purulent, but it produces a profuse or painful menstrual hemorrhage. The prolapsed parts are greatly enlarged (Plates 28 and 32), at first merely by congestion, later by connective-tissue proliferation (chronic metritis). The dragging upon the appendages causes nervous and dyspeptic symptoms. The excretion of fæces and urine is disturbed or secondary symptoms of retention appear. Aside from subjective feelings of discomfort, secondary inflammatory conditions of the peritoneum induce sterility, caused by peritoneal bands around the tube and ovary. It is true, however, that a cause of the sterility may also be found in the structural alterations in the uterine mucosa, and in the interference with coition and with the retention of the semen.

Etiology.—Congenital prolapsus of the uterus is extremely rare. I found an instance of it in a child with hydromeningocele (at the Munich Gynecological Clinic; see Fig. 23 of the text), and a second case in the Heidelberg Gynecological Clinic in 1894.* Pro-

* This was described in the Archiv für Gynäkologie by the assistant physician, Dr. Heil. I know of but one other similar case described by Qviesling in the Centralblatt für Gynäkologie, 1890.

lapsus occurs rarely even in virgins, as a result of
heavy lifting. The most frequent causes are puer-
peral injuries and premature abdominal pressure and
straining, the uterus at that time being inclined to
assume and maintain a retrodeviation; besides, diffi-
cult labors (forceps) lead to perineal defects and dis-
tentions, relaxation of the walls of the genital organs
and of the suspensory apparatus (ligaments, the con-

Fig. 23.—Congenital Incomplete Prolapsus Uteri in a full-term Fœtus
with Hydromeningocele (Munich Gynecological Clinic, 1889; *Archiv für
Gynäkologie*, xxxvii., 2). Hypertrophy of the middle portion of the
cervix; inversion of the vaginal vault; great development of the sper-
matic artery, with small calibre of the iliac artery. The os is notched
and somewhat ectropic.

strictor vaginæ and the levator ani muscles; see ex-
planation of Plates 29, 33, and 64).

Puerperal subinvolution of the soft, yielding uterus
with relaxed, wide vagina, readily leads to retrover-
sion, and a similar effect is produced by prolonged
inflammatory conditions, frequent childbirths in de-

bilitated subjects, or large tumors which force the uterus downward (see "Atlas of Obstetrics," Fig. 88). After every normal labor the anterior lip of the os may be palpated deep within the introitus vaginæ.

With reference to prognosis the acute danger of gangrene in consequence of the constriction is rarely present. The excoriations furnish a predisposition to the development of cancer (v. Winckel).

In the diagnosis it is necessary to demonstrate the descent or protrusion of the tumor during straining and coughing, for in many patients the prolapsus is relieved when they remain at rest in the recumbent position.

Does the tumor contain the uterus? How much of the vagina? Are there diverticula of the bladder or rectum? Inspection will permit of some conclusions (see Plates 26 to 28, 30). The sound and digital exploration will reveal the os and the cervical canal, also the length of the still uninverted portion of the vagina. A finger passed into the rectum will discover proctocele if present, and moreover in doubtful cases the absence of the uterus in its proper position above the pelvic strait. Finally the catheter will enable us to follow the course of the vesical diverticulum.

When the uterus is completely prolapsed we are able to grasp its body in front of the vulva and recognize at the same time the direction of the organ, whether it is retroflexed (which is most frequent), or anteflexed, or straightened (see Plates 23, 26, 27).

In incomplete prolapse we must ascertain from the rectum the position of the fundus, that is to say, whether the condition is not one of hypertrophy of the cervix. The sound will clear up this point (the

length of the normal uterine canal is 6 cm.); at the same time the distance from the external to the internal os (the latter being recognized by the resistance opposed to the passage of the knob of the sound) should be measured with the graduated sound; then the depth of the anterior and posterior vaginal vault from the external os should be measured (for further information see the explanation to Plate 24, also " Atlas of Obstetrics," Fig. 28).

Finally we must ascertain whether the uterus is freely movable or whether it is fixed in the sac by adhesions to descended loops of intestine and to its appendages.

Treatment.—By way of prophylaxis perineal lacerations should be made to heal by first intention or at least should be operated upon as early as possible (see Plate 64). If the uterus is known to have a tendency to posterior displacement, the woman should be made to maintain the lateral position. We must interdict premature getting up (never before the tenth to the fourteenth day), particularly when the above-mentioned predisposing factors exist; we must especially forbid early hard work, lifting, etc.; the patient should not be allowed to get up until after the second or third week. When the genital organs are relaxed, a T-bandage should protect the perineum and thus prevent the threatened inversion of the vagina. Catarrhs, constipation, and tumors should be removed.

When the prolapsus can no longer be averted, the most appropriate treatment would be *a priori* the gymnastic invigoration of the constrictor vaginæ, levator ani, and the entire perineal muscular apparatus by massage. These muscles form the supports of the

internal genitals (see Plates 22 *et seq.*), as has been demonstrated, among others, by Kimmel's experiments;* although I must confess that I have not had many or lasting results from the treatment. Ordinary operative treatment and pessaries answer the purpose.

Operative treatment is more radical and reliable. When the uterus is displaced backward it is brought forward into its normal position by detaching the bladder and suturing the uterus to the anterior vaginal vault (vagino-fixation after Dührssen or Mackenrodt). The organ should be retained in position by narrowing the vagina and restoring the perineum by one of the following operations. In the case of cystocele, anterior kolporrhaphy after Sims, by excising a portion of the mucosa in the shape of a myrtle leaf and stitching the wound margins together; in other cases, posterior kolporrhaphy after G. Simon, Hegar, Bischoff, Martin, v. Winckel, Fritsch, Neugebauer, or Kehrer. The operation consists in the excision of a triangle, the base of which is the perineum or the original frenulum perinæi; or instead of the triangle some angular figure which has in view the preservation of the rugous column of the vagina; or else the aim of the operation is, after removing some of the redundant mucous membrane, to bring together enough tissue from the sides so as to narrow and lengthen the vaginal wall and at the same time give it its normal curve, while the perineum is heightened plastically or restored. Therefore posterior kolporrhaphy is combined with perineoplasty, and hence the names kolpoperineauxesis (Hegar, Kaltenbach)

* Kimmel: Inaugural Dissertation, 1894, Heidelberg.

or kolpoperineoplasty (Bischoff).   The operations re-
quire to be carefully performed (the field of operation
must be accurately and smoothly exposed; the figure
to be excised must be previously planned and drawn
out, and the sutures placed exactly), and experience
is necessary in judging the effects lest too much or
too little be done in the artificial narrowing of the
vagina, so that after the operation the vulva should
no longer gape and the vaginal walls and the new
perineum may regain their normal supporting power.
The material to be recommended are buried catgut
sutures and catgut in the vagina, silkworm gut or
silver wire for the perineum.

Should ectropion or ulceration be present, it is ad·
visable to remove these portions of the os at the same
time, by carrying the kolporrhaphy incision high
enough.   In like manner we may excise or ablate not
only superficial portions of the mucous membrane but
also deeper wedge-shaped pieces of muscle (see Me-
tritis), or conical segments from the hypertrophied
vaginal portion, or parts of the cervix.   Deep and
firm silk or silkworm-gut sutures should be used.

The preparations for the operation and its after-
treatment must be carried out with equal care.   Lax-
atives should be given beforehand, the vagina should
be well cleansed antiseptically (three times, and in-
cluding the cervical mucosa), and the prolapsus
should be previously reduced because the parts are
then less hyperæmic.   After the operation, rest in
bed for three weeks; at the end of the first week the
perineal sutures are to be removed; if silk sutures
which cannot be absorbed have been used in the va-
gina, they should not be removed before the end of

that time.   Vaginal irrigations; laxatives in order to prevent a strain on the sutures.

Should the uterus be so firmly adherent in the hernial sac that its reposition is impossible or cannot be borne (despite stretching by massage and tearing of the false ligaments), and should the symptoms be troublesome, nothing remains but total extirpation (Kehrer).

· If the patient will not allow an operation, retention apparatus in the shape of pessaries should be used; first of all:

(1) Mayer's round ring pessary (see Plate 60, Fig. 3), if the vagina is still narrow below.   Unfortunately this will do harm by stretching the vagina.

(2) B. S. Schultze's sleigh pessary (see Figs. 26 and 27 in the text) corrects the posterior displacement of the uterus, permits its normal mobility, and is more appropriate to prolapsus than the following.

(3) Schultze's figure-of-eight pessary, which is calculated to find its support on the perineum (Fig. 25 in the text) and fulfils its purpose perfectly when the introitus vaginæ is intact.

(4) Hodge's lever pessary in inversion of the anterior vaginal wall (Plate 60, Fig. 4, and Fig. 24 in the text), which is suitable because it does not distend the vagina but elongates it.

(5) E. Martin's modification of Zängerle's stem pessary (see Plate 24, Fig. 3), which rests on the levator ani and is applicable to persistently recurring prolapse and wide relaxed genitals.   The older well-known stem pessaries (hysterophores) are worthless and should be employed at most as a last resort when the lower vagina is gaping.

Two pessaries, however, are not sufficiently appreciated in practice, namely:

(6) Hewitt's cradle or clamp pessary (a ring bent together in the shape of a VI); and

(7) The oval, hollow, egg-shaped, hard-rubber pessaries (usually numbers 2 and 3) reintroduced by Breisky, perhaps combined with a T-bandage, in inoperable women beyond the menopause. These pessaries require forceps for their removal.

Regarding the instructions to be observed in the treatment with pessaries see Plate 60, Figs. 3 and 4.

First of all the patient is put in the dorsal position and the prolapsed organs are replaced, pressure backward and upward in the vaginal axis being exerted upon the vaginal portion; then the posterior vaginal wall, next the uterus, and finally the anterior vaginal wall are reinverted. Temporary retention may be effected by tampons (possibly saturated with glycerin, and renewed twice a day), the patient maintaining the dorsal position. Breisky has devised a tampon carrier with conductor intended for the use of the patient in introducing the tampons herself.

As an appendix I may mention elevation of the uterus; in this displacement the uterus plays merely a passive part, since it is lifted wholly or partly above the pelvic inlet, either by tumors springing from it or from neighboring organs, or by peritonitic exudates in the shape of false ligaments.

The diagnosis and treatment, therefore, depend entirely upon the causative affection; the former is often not easy, and as the alterations are generally marked or of long standing, care must be exercised in the use of the sound, owing to structural meta-

morphosis of the organ (softening and thinning). Furthermore it should be remembered that the uterus may be crowded upward, *i.e.*, its descent into the lesser pelvis may be prevented from below, as well as dragged up (see "Atlas of Obstetrics," Fig. 97).

CHAPTER III.

PATHOLOGICAL POSITIONS, VERSIONS, AND FLEXIONS OF THE UTERUS.

The pathological positions are displacements of the uterus *in toto* forward, backward, or sidewise, while the various parts of the organ retain their relation to each other. In versions the organ is turned around a transverse or sagittal axis, usually one passing through the internal os, without having undergone any change in its contour; the opposite condition obtains in flexions, in which the uterus is bent toward the cervix. These three forms may be combined with each other, and with a change in the level of the organ (see the preceding section).

§ 9. THE PATHOLOGICAL POSITIONS OF THE UTERUS AND ITS APPENDAGES.

Displacements of the uterus as a whole and in its normal contour may be forward, backward, and sidewise: anteposition, retroposition, and lateroposition, *i.e.*, dextroposition and sinistroposition. The organ is passively displaced, most frequently by parametral or perimetritic exudates; either the recently effused mass forces the uterus to the opposite side, or retracted cord-like and cicatricial bands drag it with

9

them, as for instance on Plates 17 and 20. Thus it may happen that the uterus in the course of the disease is moved in two opposite directions (see Plate 33, Fig. 1; Plate 42, Fig. 2; Plate 36, Fig. 1; "Atlas of Obstetrics," Figs. 108, 109, 113 to 115, *i.e.*, extrauterine pregnancy). The same effect is produced by tumors, whether of the uterus itself (*e.g.*, anteposition owing to myoma of the posterior wall, Plate 42, Fig. 4; "Atlas of Obstetrics," Fig. 97) or of the neighboring organs (see Plate 43, Figs. 2 and 4, ovarian cystomata, as well as tumors of the peritoneum of Douglas' pouch and especially of the rectum or sacrum), and also by excessive distention of the adjoining organs, *e.g.*, of the bladder (Plate 33, Fig. 2; Plate 35, Fig. 4), of the rectum in chronic constipation, of the tube (see Pyosalpinx, Plate 43, Fig. 3).

A special form of lateropositions is congenital and physiological, caused by unequal growth of the ducts of Müller and their appendages (tubes and broad ligaments*). See Fig. 2 in the text.

In the diagnosis bimanual examination must first determine the normal contour of the uterus (see explanation of Plate 40, Fig. 1) and then the cause of the altered position. Usually the change in position is associated with some other displacement of the uterus (see Plate 33, Fig. 2, retroversion; Plate 35, Fig. 4, elevation; Plate 36, Fig. 1, the latter two combined). In the case of tumors of the lateral appendages and of Douglas' sac, examination should also be made for extra-uterine pregnancy. The sound should

---

* Among 130 post-mortem preparations of the adult female genitals I found the right appendages longer in 31.5 per cent. ; the left, in 27 per cent.

not be employed until the examination has accurately shown the position of the body of the uterus. From what has been stated it is clear that a careful differential diagnosis must be made, especially with reference to tumors of Douglas' sac (see explanation of Plate 37).

In uncomplicated changes of position both vaginal vaults retain their normal shape and relations; but attention must be paid to the altered position of the vagina and its diminished curvature together with marked stretching (forward in anteposition). Treatment should be directed toward the removal of the tumors and stretching of the cicatricial bands by massage.

The uterine appendages, tubes and ovaries, are very frequently displaced by inflammatory processes. When inflammatory virus (generally gonococci, staphylococci, and streptococci) passes from the interior of the tube through the abdominal orifice, perimetritic, perisalpingitic, and peri-oöphoritic exudations and adhesions result, and cicatricial retraction fastens these freely movable organs to the peritoneum of the intestine or Douglas' sac and displaces them (Plates 17 and 20). During this process the tubes may become flexed. Ovariocele and pyokolpocele have already been considered in § 7, and the above-named organs, with or without the uterus, may be contained in nearly all varieties of abdominal herniæ (see § 6 and "Atlas of Obstetrics," Fig. 95, § 36). They may also be involved in prolapsus of the inverted uterus; see § 7; Plate 21, Fig. 2.

As a rule the ovaries change their position with that of the uterus, so that we may find displacements

in all directions, on one side or on both sides. The
most frequent condition is descent of the ovaries asso-
ciated with retroversion of the uterus (Plate 61, Fig.
1), when the ovary can be palpated in its position
under the uterus.

In these displacements, too, an influence is exerted
by tumors, whether of the ovary proper with conse-
quent change of position (with or without subsequent
adhesion to other organs) or springing from other
structures and crowding tubes and ovaries out of
place. Regarding the normal position of the internal
genitals see explanation of Plates 38 to 40.

For the symptoms, diagnosis, and treatment see
the chapters on the inflammation of these organs.

§ 10. ANTEVERSIONS AND ANTEFLEXIONS OF THE UTERUS.

Not every anteversion or anteflexion is pathological.
By the latter term we understand only one which is
permanent, in connection with slight mobility of the
body of the uterus; this slight mobility may have ref-
erence to its position in the pelvis or to its relation to
the cervix. The latter condition is termed a fixed
angle of flexion when the anteflexion has resulted not
from limited mobility (that is fixation), but from ab-
normally great flexibility and has subsequently be-
come immovable by inflammatory chronic connective-
tissue proliferation. This variety of anteflexion has
been discussed in § 3 (3 and 4) under the designa-
tions of infantile and puerile anteflexion.

Etiology.—According to the definition, therefore,
we are always able to recognize—aside from the ab-

normally flexible infantile form—a displacing cause external to the uterus, usually the cord-like bands of parametral or perimetritic exudations.   The latter may fix either the body of the uterus to the bladder and the anterior pelvic wall (Plate 35, Fig. 4) or the cervix backward, which is the more frequent condition (Plate 35, Fig. 2).   When an adhesion at about the level of the internal os drags upon the posterior wall of a still flexible uterus an anteflexion results (Plate 34, Fig. 1).   Such a condition, may also be caused by forward fixation of the cervix (as shown by Plate 34, Fig. 2); this, however, is rare.

Tumors also effect anteversions and anteflexions in various ways: either when springing from other organs and exerting pressure from above and below (ovarian cystomas), or by myomata of the anterior wall of the corpus uteri which may simulate flexions (hence sounding is required for exploring the course of the uterine canal, see Plate 35, Fig. 3), or by submucous polypi in the way shown on Plate 34, Fig. 4. Anterior myomata, according to their location on the cervix or body, may cause anteversion or anteflexion (see Plate 40, Fig. 4).

As to the symptoms and diagnosis, we may once more repeat what has been stated in § 3 (3 and 4). Dysmenorrhœa, sterility, constipation, and vesical troubles are the consequences not so much of the mechanically altered relations (flexion at the internal os with stenosis, pressure of the corpus uteri upon the bladder, see Plate 34, Fig. 3 and Plate 35, Fig. 2) as of the endometritic and parametritic hyperæmias and proliferations.   Constipation with violent pains and signs of dyspepsia, owing to the cicatricial contrac-

tion of the pararectal adhesions, are among the most constant concomitant symptoms; this is also true of vesical catarrh.

The points to be determined are the pathological character of the anteversion or anteflexion, the diminished mobility of the corpus uteri, the fixed cervix (backward and usually upward), and the cause of the fixation, that is to say, generally parametral exudations about the cervix (Plates 43 and 63, Fig. 1) and the bands about the rectum. Reliable information as to the direction of the uterine canal is furnished by the sound and the bimanual determination of the position of the fundus in relation to the longitudinal direction of the cervix.

The *treatment* of course aims at the removal of the causes; see also the chapters on parametritis, perimetritis, myomata, and § 3 (3 and 4). Symptomatically, attention must be paid to the relief of the uterine catarrh (see Endometritis), the pains (see Parametritis and § 4, No. 8), the vesical irritation (see Cystitis), and the constipation. The latter must be treated energetically: lukewarm injections of water, oil, or infusion of senna, followed by the internal administration of the mildest laxatives. The intestinal tenesmus is combated with the same narcotics as the dysmenorrhœic and parametritic pains, in the form of suppositories and rectal injections.

During the painful attacks and inflammatory exacerbations, rest in bed is indicated.

The operative treatment and that by intra-uterine tents has been described in § 3 (3 and 4); it may be further noted that the latter might be supported by

a Mayer round pessary surrounding the vaginal portion.   The former measures will include also the excision of retracting cicatrices in the vaginal vault (see Plate 13).

Bands and cords which are located higher up may be stretched or torn by massage (Plate 63).

§ 11. Retroversions and Retroflexions of the Uterus.

The term retroversion includes all the positions in which the fundus uteri is vertically above the cervix or back of it, if the condition is permanent.   The various degrees of retroversion and retroflexion will be found on Plate 46, Figs. 2 and 3.

Etiology.—I have seen several instances in the newborn with particularly well-developed uteri in the slightly anteflexed position which is physiological in the adult.   Congenital retroflexions have also been described by Saxtorph, C. Ruge, and v. Winckel, and puerile retroflexions are more frequent than the later pathological forms.   v. Winckel and Küstner explain a portion of the latter as derived from the former by the supervention of noxious influences such as habitually full bladder, early and excessive straining, in the same way as a similar effect may be produced in the puerperal state by the dorsal position when the uterine walls are relaxed.

Puerperal processes, however, also act in another way, the most frequent of all causes being inflammations in combination with injuries to the vaginal vault and the distention, stretching, and relaxation (Plate 33, Fig. 3) of the genitals.   Corresponding to

the latter cause, a predisposing effect is exerted, too, by general constitutional and local weakness (chronic and dyscrasic diseases, subinvolution of the uterus after labor; masturbation, and the like).

By such inflammatory indurations the cervix may be dragged forward (Plate 34, Fig. 2, and Plate 33, Fig. 4) or be crowded forward by tumors, a chronically constipated rectum, etc., which act from beneath the body of the uterus, or else the corpus uteri is fixed to the rectum or the posterior pelvic wall by perimetritic bands (Plate 36, Figs. 1 and 2, and Plate 31).

Myomata situated in the uterus (Plate 37, Figs. 1 and 2) or tumors pressing from above, from the vesico-uterine excavation, may produce retroversions and retroflexions (Plate 36, Fig. 4), in the same way as the dorsal position with relaxed puerperal uterus may result in the same condition through the weight of the latter organ plus the pressure of the intestines. This displacement is usually associated with descent of the uterus (Plate 36, Fig. 3), and may subsequently give rise to prolapse of the retroflexed uterus (Plates 22, 23, 27; for the gravid organ see "Atlas of Obstetrics," Fig. 88).

Aside from primary inflammatory processes, when the uterus has become retroverted, adhesions to the posterior peritoneal surfaces form secondarily.

Symptoms presented by the uterus: menorrhagia due to congestive hyperæmia and secondary proliferation of the mucosa as a result of the latter; dysmenorrhœa, partly due to mechanical obstruction by the flexion; and catarrhal secretion. Sterility occurs, but less constantly than in anteflexion.

Pressure of the vaginal cervix causes dysuria mechanically by the flexion of the urethra as well as of the ureters (Plate 61, Fig. 1), and also interferes with defecation.

There are reflex nervous disturbances, not only of digestion but also of the respiratory and circulatory organs (tachycardia, uterine asthma, etc.), together with the whole host of hysterical symptoms: convulsions, fainting fits, hystero-epilepsy, cardialgia, paraplegia, aphonia, spasmodic cough, globus and clavus hystericus, hyperæsthesia, and especially—owing partly to the pressure, partly to inflammatory processes—motor and sensory disturbances of the lower extremities (weakness, formication).

The *diagnosis* is made by bimanual exploration; palpation and specular inspection having demonstrated that the anterior lip is thinned, shortened, and, together with the os, directed forward toward the symphysis, while the posterior lip is thickened. The uterus is palpated from the abdominal wall, Douglas' pouch being covered with the hand, and perhaps also from the rectum. At the same time it should be noted whether the uterus is fixed by adhesions.

Treatment.—The last-named manipulation (Plates 38 and 39) leads to the manual treatment of the posterior displacements. If the uterus is not fixed, it is replaced, that is to say, its body is laid upon the anterior vaginal vault; if it is fixed, massage (Thure Brandt) is commenced (Plate 63), and perhaps this may be followed by a forcible tearing of the adhesions.

If the free uterus cannot be thus replaced, the sound is to be used or else the bullet forceps in the

way suggested by Küstner (see explanation of Plate 60, Figs. 1 and 2).

When the uterus has been returned to its normal position, it requires to be retained by a lever pessary (see § 8 and explanation of Plate 60, Figs. 3 and 4, and Figs. 24 to 27 in the text); the use of cold douches to the cervix and sacrum, the subcutaneous injection of ergotin, and the exhibition of other tonics
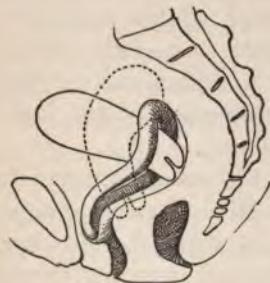
Fig. 24.—Hodge's Lever Pessary inserted in Retroflexion of the Uterus of the First Degree, and effecting its normal position mainly by stretching the posterior vaginal vault.

Fig. 25.—Schultze's Figure-of-Eight Pessary fixes the Cervix in its Normal Position, and is supported by the vaginal wall and the pelvic floor.

for invigorating the walls of the uterus and its ligaments being generally inadequate.

Pessaries are to be tried in the following order:

(1) Hodge's S-shaped pessary (with rather marked curve) when the sacro-uterine ligaments are not sensitive.

(2) Schultze's figure-of-eight pessary when the pelvic floor is normal and the vagina is not too yielding; sometimes the instrument must be long drawn out or a free intra-uterine stem must be inserted in addition.

(3) Schultze's sleigh pessary when the vagina is yielding or the pelvic floor is defective or relaxed.

(4) Hewitt's clamp pessary.

Inflammations of the endometrium, perimetrium, and the bladder must receive appropriate treatment. If replacement is not feasible on account of adhesions, the condition is made bearable by a firm tam-

FIG. 26.—Rare Mode of Insertion of Schultze's Sleigh Pessary, when the pelvic floor is firm.
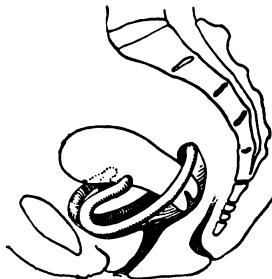
FIG. 27.—Ordinary Mode of Insertion of Schultze's Sleigh Pessary, which is supported by the vaginal wall and the symphysis. The cervix is fixed between the anterior and the posterior wings; to be employed in descent of the retroflexed uterus.

ponade of the posterior vaginal vault with glycerin tampons.

When pregnancy ensues, the pessary is to be left in until the fifth month; at any rate the gravid retroflexed uterus requires supervision lest it become incarcerated beneath the sacrum (see "Atlas of Obtetrics," Fig. 85, §§ 23, 24).

Operative interference is resorted to, partly to detach firm adhesions which usually elevate the uterus considerably, partly to fix the organ in front,

and we may operate by kœliotomy or from the vagina.

When the uterus is readily movable, vagino-fixation (Schücking, Dührssen, Mackenrodt) is indicated, the last-named method being the most reliable. It is carried out as follows: Transverse incision in the anterior vaginal vault; starting from it a longitudinal incision; free detachment of the uterus from the bladder; opening of the vesico-uterine peritoneal excavation; suturing of the anterior uterine wall (immediately above the internal os) to the anterior vaginal wall (hysterokolpopexy).

When the uterus is firmly adherent, ventrofixation is performed (Olshausen, Czerny, Leopold, Sänger); of these the Czerny-Leopold method is to be preferred, viz., direct suturing of the uterine peritoneum to the serous parietal layer of the abdominal wall (Sänger attaches the round or broad ligaments by suture).

The Application of Pessaries with Reference to Certain Complications of Retroversion.

(1) Retro-uterine adhesions (see Plate 32). These must be slowly stretched (three or four times during at least twelve sittings, first elevation in retroposition in order to stretch the anterior fixations, then anteflexing) or forcibly torn, after which the patient must rest in bed, a pessary being inserted and an ice-bag applied, so as to prevent the formation of an hæmatocele. Some relief may also be afforded by tamponing the posterior vaginal vault.

(2) Chronic perimetritis must be arrested before any interference is attempted.

(3) Parametritic bands and scars (lacerations) (see Plate 13) are excised transversely in the form of a longitudinal oval; the row of sutures is inserted vertically to the greater diameter of the oval, that is to say, in the longitudinal direction of the vagina, so that an elongation takes the place of the preceding cicatricial retraction (Martin).

(4) Chronic metritis; this should be first operated upon (wedge-shaped excision), then a pessary inserted, or, if this cannot be borne, glycerin tampons; the same treatment is to be used in acute metritis until the pains have disappeared.

(5) Endometritis: astringent and antiseptic vaginal irrigations twice a day, and frequent removal of the pessary; the uterus is to be treated with caustics, perhaps with irrigations, the insertion of medicated bougies, etc. Erosions of the os should be cauterized or excised.

(6) Stenosis of the cervix requires previous discission.

(7) If the vaginal portion of the cervix is too short it will exert too little leverage upon the corpus uteri and the latter becomes flexed, or else the vaginal portion escapes from the pessary and erosion will result; the Hodge lever pessary should therefore be inserted in the inverted position, with the upper closed curve backward.

(8) If the anterior vaginal wall is too short it should be elongated by the operation mentioned under (3) (Skutsch).

(9) If the vagina is abnormally wide and relaxed it should be narrowed by kolporrhaphy. If this operation is not allowed, the sleigh pessary is to be in-

serted in the inverted position, as in Fig. 26 in the text.

(10) Childbed is the proper time for treating organs and bands, since they can be moulded at that time. Replacement should be effected by Schultze's method: the cervix being crowded backward, the fundus elevated, and the body of the uterus jerked forward, the finger being hooked into the cervix. Retention is effected by tampons, two of which are inserted transversely into the anterior, sometimes into the posterior vaginal vault. The patient must maintain the lateral position.

During pregnancy the pessary need be worn only to the fourth month, because after that time the uterus remains in position on account of its volume (see above).

(11) In contractions of the introitus vaginæ operative interference is called for before the insertion of the pessary (hymenal stenosis—the intact hymen should be torn if the cause of the symptoms can be positively assigned to the displacement; vaginismus).

(12) Perineal defects associated with vaginal inversion and descent of the uterus should be cured by operation, otherwise a sleigh pessary is to be used (sometimes as in Fig. 26 in the text).

(13) Tumors and senility are contra-indications.

(14) When a pessary is in good position and still the patient complains, the pessary should be removed and some other cause for the symptoms traced out (hysteria).

For the rules regarding the insertion and the wearing of pessaries see the observations to Plate 60.

Torsion of the uterus is the term applied to the

pathological twisting of the organ around its longitu-
dinal axis, caused by tumors. or by abnormal filling
of neighboring organs, or by parametritic or peri-
metritic fixations (see Plate 17); hence it will be evi-
dent that other displacements are usually associated
with the condition. The infravaginal cervix is dis-
placed accordingly (see Plate 13).

There is a physiological torsion (the cause of the
first vertex presentation), the anterior surface of the
uterus being turned to the right and forward so that
the left edge of the symphysis is the nearer; the
child, therefore, will find more room for its back in
the left side than in the right, which is narrowed by
the spinal column.

PART III.

Inflammations and Trophic Disturbances.

CHAPTER I.

INFLAMMATIONS AND THEIR SEQUELÆ (ACQUIRED STENOSES AND ATRESIÆ, ATROPHIES OF ORGANS, EXUDATION TUMORS).

In every part affected, inflammations attack either the parenchyma, that is to say, the epithelial and glandular tissue (glandular inflammation) or the connective tissue (interstitial inflammation). The two may be combined. The inflammation may run an acute or a chronic course. The former process is associated with active proliferation (hypertrophies and hyperplasiæ, round-cell formation), the latter with atrophy and the formation of spindle cells and fibres. Inflammation causes increased secretion which, depending on the degree of the process and the tissue elements affected, may be serous and mucous (catarrhal) or purulent, or both.

The cause in most cases is infection with microbes, among which gonococci, staphylococci, and streptococci play by far the most important part. Their introduction is due to sexual connection, to the puerperal state, to operations, or to infection from other organs (tuberculosis).

The termination in spontaneous recovery is rare,

more often destruction of the parenchyma by retained secretion or abscess formation results, or cirrhotic connective-tissue retraction, besides the detriment to the general health.

§ 12. GONORRHŒA.

The acute disease arises from infection with the pus of an acute urethritis. The vulva and the vestibule are covered with a thick, creamy, yellow pus which exudes profusely from the vagina when the introitus is opened. These parts are swollen, markedly reddened, and sensitive. The finger introduced into the vagina expresses similar pus from the urethra by moving the anterior wall with the urethra from within outward toward the pubic arch. Micturition is associated with a sharp, burning sensation, followed by violent vesical tenesmus; every quarter or half hour the desire to pass water recurs and each evacuation is again followed by dysuria—symptoms of vesical catarrh; the urine becomes turbid and has a penetrating ammoniacal odor (neutral or even alkaline reaction).

The gland of Bartholin usually does not become inflamed until later (see Plate 4, Fig. 2). In relatively rare cases there develop subsequently also proliferations of the cutaneous papillæ—pointed condylomata (see Plate 3, Fig. 2).

The vaginal mucosa is likewise inflamed, sensitive, and sprinkled with bright-red points formed by the swollen hyperæmic papillæ. The purulent secretion, however, does not come from this part (the vagina is devoid of glands) but from the cervix, which is early implicated (see Plate 14, Fig. 2). The swollen cervi-

cal mucosa, of a bright-red color, projects into the external os; there is therefore a cervical endometritis. The process is arrested for the time at the internal os.

Only in children does a prolonged true gonorrhœal vaginitis occur.

The course is different in infection by latent gonorrhœa. By this is meant gleet, in which there is a short stricture of the membranous part of the male urethra, with a painless secretion in drops, especially noticeable on rising in the morning; there is rarely any pain in the penis or in the epididymis, but a stinging sensation at the root of the organ during erotic excitement. Such infection gives rise in women to a slow inflammation, the first symptoms of which—burning during micturition and some secretion—are generally overlooked. The disease manifests itself only when it increases and attacks the mucous membrane of the corpus uteri.

At this point the two forms of the disease resemble each other. The corporeal endometritis causes irregularities of menstruation, all pathological forms of which alternate with one another (see § 4); there is at the same time, owing to the inflammatory hyperæmia of the uterus, the sensation of a heavy body, a fulness in the pelvis, later there follows also a direct uterine pain. These pains may also arise from inflammation of the tubes, the passage of the gonococci from the uterus to the tubes being rapid.

The process now for the second time comes to a standstill; the latent gonorrhœa may persist permanently, as the acute form did at the internal os.

The discharge is increased and purulent.

The process rarely extends to the peritoneum from

the tube, because the isthmus or the fimbriated extremity is sealed; the tube is transformed into a closed distended pus sac, a pyosalpinx.

The peritoneum may be involved in two ways: either from the interior of the tube through the parietal tissue, that is to say, passing through its lymph channels to the subperitoneal coat; or else extending from the pavilion of the tube to the peritoneum and ovary. The ovary likewise may be infected either through the lymph channels or from the peritoneum; in this way the painful, chronic, circumscribed form of peritonitis of Douglas' sac, perimetro-salpingitis, and perimetro-oöphoritis are set up. In the ovarian tissue abscesses may develop from an interstitial inflammation. These alterations proceed with attacks of high temperature and great pain, and lead to sero-fibrinous exudations in Douglas' sac, which subsequently become consolidated by absorption and form adhesions between the surfaces of the peritoneum and the several pelvic organs. Manifold displacements and changes of position of the uterus, its appendages, loops of intestine, and the rectum are thus brought about.

The disease of the tubes (usually bilateral) leads to an additional symptom—sterility (some cases of one-child sterility).

It is a noteworthy fact that the gonococci prepare the way for the pus cocci, so that in the later stages we have to deal with mixed infections.

The symptoms therefore are: burning during micturition (perhaps vesical catarrh and Bartholinitis, the former recognizable by turbid alkaline urine containing coffin-lid crystals of the ammonio-magnesian

or triple phosphates, star-shaped and thornapple-like crystals of urate of ammonia, numerous micrococci, mucus, pus and blood corpuscles; the latter by great pain, redness, swelling, and fluctuation at the lower third of the labia majora, see Plate 4, Fig. 2), purulent vaginal discharge, irregular menstruation, pain, and sterility.

Diagnosis.—Demonstration of the gonococci (by staining for half a minute with an alcoholic solution of methylene blue; this is the only coccus decolorized by Gram's method; they should be demonstrated especially in pus cells); the source of the pus must be traced to the cervix, the pain to the body of the uterus or to the appendages and the peritoneum of Douglas' pouch.

Treatment.—In recent cases, vaginal irrigations with sublimate solutions (1 : 2,000 to 1 : 5,000), continued for weeks. In urethritis, swabbing with a similar sublimate solution or a two-per-cent silver-nitrate solution. Bartholinitis results in abscess; when fluctuation appears the abscess is incised and tamponed with iodoform gauze. Condylomata are removed with the scissors or cauterized with 25 per cent chromic acid. Cystitis requires the irrigation of the bladder with 0.3 per cent solution of salicylic acid or 0.2 to 0.6 per cent solution of silver nitrate and 0.25 per cent solution of cocaine (from one to two pints, lukewarm, by means of a catheter and Hegar's funnel or by Küstner's urethral funnel instead of the catheter).

Not until the vagina has been irrigated for weeks is the treatment of the uterus commenced, and this is the same as in endometritis and metritis (see the following §§). But it must be remembered that we have

first to exclude disease of the appendages, since every therapeutic intra-uterine manipulation is followed by an exacerbation of the affection of those organs. Therefore treatment should be directed first to the salpingitis, etc. (see § 16).

§ 13. CHRONIC ENDOMETRITIS. EROSIONS AND ECTRO-
PION OF THE Os.

Endometritis is a disease of the uterine mucosa alone; it may therefore occur as a disease *sui generis* without implicating other organs.

Endometritic changes are produced by gonorrhœa, and although this plays the chief rôle in the etiology of uterine catarrhs, there is a considerable group of cases in which the origin must be sought in other infections, especially as they may occur even in virgins. Pus-producing microbes may be active in these cases and frequently their introduction may be traced to masturbation.

Another group, which, however, does not belong here, but represents a general disease, is formed by septic infection, whether due to the puerperal state or to operative manipulations.

Clinically we may distinguish:

(1) Catarrh (*a*) of the cervical, (*b*) of the corporeal mucosa;

(2) Purulent inflammation (*a*) of the cervical, (*b*) of the corporeal mucosa.

Anatomically both forms are synonymous with (1) purely glandular, (2) interstitial inflammation (see explanation of Plate 7, Fig. 4; Plate 8, Figs. 1 and 2; Plate 5, Fig. 3).

The cervical affection is more frequent, that of the uterine mucosa more serious in character.

(a) *Cervical Catarrh and Its Sequels: Erosions and Ectropion.*

Symptoms.—The discharge (leucorrhœa) is the first and most constant symptom; in pure catarrh it is mucous and tenacious; in purulent mixed forms, muco-purulent from the admixture of pus corpuscles. This flow in time weakens the patient and by the formation of a tough cervical plug prevents conception. As the mucosa undergoes inflammatory proliferation (see Plate 7) the blood-vessels are overfilled and easily give way. This gives rise to menorrhagia and dysmenorrhœa and hemorrhages on slight touch.

Pain is also felt between the periods when the swollen mucous membrane protrudes from the os—ectropion (see Plate 5, Fig. 3, and Plate 12).

Diagnosis.—On palpation we discover the thickening of the vaginal portion, and the finger on withdrawal shows the tough mass of mucus or pus. Structural alterations are felt only in older cases of ectropion, and this finding leads to the suspicion of commencing carcinoma.

Inspection should therefore be made with the speculum. In multiparæ and in ectropion, the examination of the mucosa is clear; in the closed os of the nullipara we recognize at most at the border or through the epithelium of the vaginal portion the translucent retention cysts of the cervical glands—ovula Nabothi (see Plate 12); in such cases, therefore, we must draw the uterus down with bullet forceps and evert the lips of the os

with tenacula, or perhaps split the commissures (these must be subsequently sutured).

The cervical cavity is distended by the profuse secretion; this condition can be demonstrated by means of the sound.

The secretion furthermore causes a desquamation of the superficial layers of pavement epithelium round about the os, *i.e.*, a simple erosion results (see Plate 5, Fig. 3; Plate 15, Fig. 2). When the matrix cells develop into cylindrical epithelium and glandular formations, a papillary erosion results (see Plate 50, Fig. 1). When either of these conditions is associated with ovula Nabothi, we have a follicular erosion (see Plate 16, Fig. 2).

The differential diagnosis from ectropion is based on the position of the os within the erosion or in its centre, but outside of the ectropion and crowded apart by it.

The differential diagnosis between papillary erosion and cancerous papillary ulcer is most surely made by the microscope (see Plate 5, Fig. 1, and Plate 45, Figs. 1 to 3). The follicular variety may form polypoid excrescences by circumscribed extensions of portions of the mucosa (see Plate 59, Fig. 3).

The differential diagnosis between ectropion (Plate 59) and incipient cancerous ulcer is never based on the touch, since both present the feel of hard solitary nodules (see Plate 49, Fig. 2; Plates 51 and 52), but upon inspection—ovula Nabothi in ectropion, nodules with ulcerative disintegration in cancer. Before the occurrence of ulceration the only means of diagnosis is the microscopic examination of an excised piece.

In the prognosis the fact that cervical catarrhs are

slow to heal and that the inveterate forms have a tendency to malignant degeneration is important.

Treatment.—The local treatment of the cervical mucosa is the same as that of catarrh of the corpus uteri. The swelling of the vaginal portion and the ovula Nabothi are treated by multiple punctures and scarification. When the os is narrow, lateral discissions are made, which may extend as far as the vaginal vault (see § 3, Nos. 3 and 4).

Erosions are to be combated with cauterizations, namely, wood vinegar with the addition of four per cent of carbolic acid is poured into the speculum and allowed to act for a few minutes; this should be done every day for several weeks. Gradually the reddened or ulcerated portion around the os disappears, the pathological cylindrical epithelium being replaced by new epidermoidal cells. When in the case of deeper ulcers the epithelial covering is again exfoliated, cauterization is performed with one drop of fuming nitric acid, followed by a warm-water douche. Otherwise excision will be required.

The ectropion and the swelling, and perhaps the follicular hypertrophy of the mucosa, in their slighter forms disappear after the treatment of the catarrh as such with caustics.

The severe forms are subjected to operation, that is, to removal of the swollen mucosa by means of a wedge-shaped excision from the entire thickness of the cervical wall (see under Metritis, § 14).

(b) *Corporeal Endometritis.*

All forms of endometritis, whether corporeal or cervical, may be acute or chronic and occur in slighter or severe forms.

The latter division furnishes differences not only in degree but also in quality, namely:

The slighter forms produce no structural alterations; only the secretion is increased—glairy mucus, associated with hemorrhages. The severe forms lead to proliferations and to a purulent discharge.

These differences are based also on histological variations, as shown on Plates 7 and 8; they are as follows (Ruge, Veit):

I. Glandular endometritis: (1) Hypertrophic, *i.e.*, the glands proliferate solely in length and roll up into a spiral because they are firmly confined between the surface of the mucous membrane and the border of the muscular coat. On longitudinal section therefore they appear coiled corkscrew-like or like a saw edge; (2) hyperplastic, *i.e.*, the glands proliferate in length and breadth so as to form considerable projections.

II. Interstitial endometritis: (1) Acute, round-cell proliferation, causes purulent secretion; (2) chronic or cirrhotic, fibre formation and atrophy, terminating in atrophic endometritis.

The glandular forms occur as mixed types, especially with acute interstitial endometritis; when the hyperplastic form and marked proliferation come into the foreground we have:

III. The mixed form fungous endometritis if it is diffuse; or

IV. The mixed form polypoid endometritis and follicular endometritis (Plate 59, Fig. 3) if the proliferation is circumscribed.

To the groups II. and III. the following varieties are superadded. They exhibit as the most pronounced symptom hemorrhages or expulsion of the mucosa:

V. Exfoliative endometritis (membranous dysmenorrhœa, see § 3).

VI. Dissecting endometritis, with phlegmons.

VII. Hemorrhagic endometritis: slight secretion, fungous mucosa; after abortion and acute infectious diseases.

When the endometritis occurs as a sequel to an abortion, whose cause it has been in most cases, it is termed:

VIII. Endometritis post abortum, recognizable by the large decidua cells.

Ovula Nabothi arise:

(1) By excessive proliferation and secretion in I., 2;

(2) By a constricted efferent canal in I., 1;

(3) By its spiral constriction in I., 1;

(4) By its compression by means of the inflammation of connective tissue in II., 1;

(5) By cicatricial occlusion in II., 2.

Symptoms of chronic corporeal endometritis:

(1) Pain either only at the time of menstruation, *i.e.*, dysmenorrhœa (with or without expulsion of a menstrual decidua); or between the periods, *i.e.*, intermenstrual pain; or continuous and ceasing with the flow of blood, so that only the time of menstruation is painless; or permanent and exacerbating with the period (see § 17);

(2) Discharge, usually bloody, sero-mucous (according to Küstner, Schröder), and purulent (B. S. Schultze);

(3) Menstruation altered, with menorrhagia and dysmenorrhœa;

(4) Sterility;

(5) Reflex nervous disturbances: pain in the umbilical region, dyspepsia, all sorts of hysterical manifestations.

Diagnosis.—(1) The sound demonstrates the typical pain on passing the internal os with the knob—a pain well known by patients without power of localizing it; besides, the entire uterine mucosa is sensitive to pressure.

Examination with the sound is also of importance objectively by giving information as to the width of the cavity and the uneven surface of a fungous mucosa.

(2) Curetting (raclage, excochleation) may be performed to procure a specimen for microscopical examination.

(3) In doubtful cases, for instance when polypous proliferations are suspected to be present, the cervical canal is to be dilated (metallic dilators, Küstner's adjustable dilator, laminaria tents, thoroughly sterilized).

Prognosis.—Serious consequences may result from the hemorrhages and loss of fluids or else by malignant transformation.

Treatment.—First of all care must be had to provide for regular and sufficient outflow of the secretion; the external and especially the internal os (normally 4 mm. wide) represent, particularly during inflamma-

tory swelling of the mucosa, the retention constric-
tions which eventually require artificial dilatation.
The removal of the secretion is facilitated by vaginal
irrigations with astringents (alum, tannin) or antisep-
tics (2 per cent carbolic-acid solution, 0.25, 0.50–0.1
per cent sublimate solution), whereby the uterus is
stimulated to contract and the cervical mucosa is di-
rectly washed.

Furthermore, the diseased mucous membrane must
be "altered"; this may be effected by astringents or
caustics. Strong caustics, however, should be guard-
ed against, for they may produce strictures, stenoses,
and agglutinations (for instance, chloride of zinc so-
lution of ten per cent strength and above). These
drugs are best applied in liquid form (liquor ferri
sesquichloridi, 50 per cent or undiluted, 2 per cent
silver-nitrate solution, 5 per cent chloride-of-zinc
solution, fuming nitric acid) by means of a cotton-
wrapped aluminium sound.

While the above-named "*alteration*" refers to the
structure and is effected by the cauterizations here
enumerated, it is necessary to remove at the same
time the noxious infectious virus, either by the caus-
tics or by antiseptics. Besides the intra-uterine irri-
gations by Fritsch's double catheter, the introduction
of iodoform bougies is useful for this purpose.

Cervical dilatation and disinfection are effected
simultaneously by tamponing the cavity with iodo-
form gauze (to be renewed daily according to
Abel).

A radical effect is produced by the removal of the
diseased and microbic mucosa with the curette. This
is performed with Simon's sharp spoon or the looped

curette in such a way as to scrape carefully and uniformly the several walls of the uterus in a definite order, the cervix being fixed with bullet forceps. Partly in order to arrest the hemorrhage, partly for disinfection, cauterization with liquor ferri sesquichloridi or three per cent. carbolic-acid solution by means of a cotton-wrapped applicator should immediately follow. Curetting is preceded by dilatation and thorough disinfection. Should the hemorrhage continue, especially in endometritis post abortum, the uterus is packed with iodoform gauze.

From the third or fourth day after the curetting a good effect is produced by daily intra-uterine irrigation with carbolic-acid solution. In the case of greatly proliferating fungous endometritis the new formation is kept in check by the use of astringents (liquor ferri sesquichloridi, tincture of iodine) every other day, preceded by uterine irrigation.

Anæsthesia will be required in most cases for the operation, and narcotics for the pains which may follow the injections.

§ 14. Chronic Metritis (Infarction of the Uterus).

Definition.—As the etiology is manifold, so is the clinical picture of chronic metritis. It depends upon the inflammatory hyperæmia, the swelling, and the sensitiveness of the entire organ, which lead to connective-tissue hyperplasia, and in a minor degree to muscular hypertrophy. The inflammation, which is slow in its course, increases now and then by acute and subacute exacerbations until in course of time many cases terminate in the cirrhotic condition which

is the common result of every chronic inflammation.

There are, therefore, two stages: (*a*) the stage of hyperæmia and round-cell infiltration; the uterus is soft and easily lacerated, owing to œdema and fatty metamorphosis of the muscular coat.

(*b*) The stage of cirrhotic induration; the uterus is firm, anæmic, or livid through venous stasis (arterial walls thickened, their lumina contracted; the muscular tissue is replaced by fibrous tissue).

Etiology.—(1) Deficient puerperal involution; (2) the preceding inflammatory irritation of a prolonged endometritis; (3) other hyperæmic irritations such as masturbation, etc.; (4) venous stasis in flexions, prolapse, or other displacements associated with congestions (habitually full bladder, chronic constipation, or as a secondary congestive symptom of circulatory disturbances in other organs); (5) in rare cases the disease may result from the acute form when absorption has failed to occur.

Ordinarily endometritis is associated with metritis; the great sensitiveness of the entire organ, not of the ndometrium alone, indicates this.

Prognosis.—Although the disease is not arrested at the menopause, and indeed (with or without atypical hemorrhages) not until several years later, still at this time it responds most readily to treatment. The outlook is more favorable after the occurrence of the second stage in which the symptoms cease.

Symptoms.—A sensation of fulness and of a heavy body in the abdomen; sacralgia and lateral pains; discharge, menorrhagia, and dysmenorrhœa; dysuria and constipation. All the symptoms are aggravated

at the time of menstruation and during particularly
obstinate constipation; they are ameliorated by rest
in the dorsal position.

Diagnosis.—The cervix is soft, thickened, and
hyperæmic; the lips of the os are tumid and often
associated with endometritic symptoms—ectropion,
erosion, and ovula Nabothi (see Plate 12); in the
second stage the cervix is livid, firm, and wrinkled
(see Plate 10, Fig. 2; Plate 11, Fig. 1; Plate 15, Fig.
1).

The sensitiveness is not constant nor uniform; but
there is invariably a peculiar softening and enlarge-
ment of the organ which resembles that of pregnancy
at the second or third month. The sound demon-
strates a lengthening of the canal of the uterus and a
thickening of its walls.

There may be furthermore every variety of inflam-
mation of the surrounding tissues and appendages.
Conception, which is rare, usually terminates in
abortion or premature labor.

Differential Diagnosis.—The pregnant uterus in the
first months is hard to distinguish from an inflamed
organ; the former is softer, especially the tissue of
the lower cervix and at the internal os (felt from the
rectum on bimanual examination), and is located
upon the cervix like a round balloon. The cervix is
more sensitive. Pregnancy is to be particularly borne
in mind when metritis is suspected, especially when
intra-uterine treatment is intended.

Intra-uterine tumors (myomas) are felt directly
with the sound or after dilatation of the cervix; the
inflamed uterus is elongated, especially the cervix,
which is narrowed in virgins and ectropic in multip-

aræ. In cancer of the cervix the microscopical examination of extirpated particles will decide the question, with possible performance of a wedge-shaped excision.

The point whether the inflammation affects only the mucosa (endometritis) is determined by the lesser volume and the slighter sensitiveness of the entire organ.

Treatment.—Prophylactic, during menstruation rest in bed (only temporarily); the avoidance of all causes of congestion (excitement, especially sexual, stimulating food, constipation, taking cold); during the puerperal state, hot vaginal irrigations (117.5° to 126.5° F.) or warm full baths (95° to 100° F.).

Absorption is favored in the hyperæmic stage by hot injections and baths, with or without the addition of salts.

Hyperæmia is counteracted by causing the vessels to contract by the use of ergot or ergotin (continued for some time); by hot vaginal injections; by scarification of the cervix every three or four days, withdrawing one-half to two tablespoonfuls of blood, to be particularly recommended before the onset of the dysmenorrhœic period, as lessening the congestion and pain.

For depletion and derivation, carbolized glycerin tampons, also the treatment of the endometritis by astringents (which later on determine an increased secretion) or caustics which are followed in a few days by the discharge of the brownish eschars or pure blood (when pain ensues after the irrigation, rest, and hot injections). The application must be repeated every week, but only during the first stage.

Curetting followed by the introduction of iron chloride (Playfair's aluminium sound).

The above-named methods of treatment, which are partly prophylactic, partly absorptive, and partly intended to lessen the hyperæmia, are at the same time symptomatic and palliative. For the pains and sense of fulness, frequent scarifications and carbolized glycerin tampons are indicated; perhaps, in order to relieve the uterine ligaments, a hypogastric belt and pessary.

For the menstrual disturbances, preceding scarification, warm sand bags applied to the abdomen or warm alcohol (Kehrer), and narcotics; when menorrhagia has set in, we resort to ergotin, tamponing, the introduction into the cervix of the sound wrapped with chloride-of-iron cotton.

Operations for the Purpose of Shortening the Cervix Uteri and Removing the Diseased Mucous Membrane.

These objects are sought to be attained by wedge-shaped excisions or amputations or the removal of hollow cones according to Sims, Hegar, and Simon; the operations are sometimes combined with the excision of scars of laceration. The best results are obtained by the following methods, which may be performed in Sims' lateral position. (1) Schröder's operation.—Both lips of the os are divided by deep incisions parallel to the longitudinal axis of the cervix, the commissures having been previously freely cut. Short transverse incisions passing from the mucous membrane into the depth of the cervix completely excise the internal half of the cervix with the diseased mucosa thus circumscribed. The remaining

11

half is turned inward and sutured to the rest of the cervical mucous membrane.

(2) A. Martin's operation.—A deep conical excision is made from the entire vaginal portion. The cervical mucosa is drawn down and stitched to the vaginal mucosa.

(3) Kehrer's operation.—From both lips of the os wedges are excised in such a way that the entire width of the cervical mucosa forms the bases of triangles, whose two equal sides pass through the wall of the cervix, so that the apices come to the external surface of the vaginal portion (anterior and posterior wall). The two wounds together therefore form a parallelogram. By deep transverse sutures the lips are elongated in a sagittal direction.

After-Treatment.—A carbolized glycerin tampon for twenty-four hours; then vaginal irrigations; should after-hemorrhages take place, liquor ferri sesquichloridi or circumligation; removal of the sutures after eight days.

§ 15. Sepsis.

(Acute Vulvitis, Vaginitis, Endometritis, Metritis, Salpingitis, Parametritis and Perimetritis, Peritonitis—Puerperal Fever.)

Etiology and Clinical Picture.—Immigrated pus cocci (streptococcus pyogenes; staphylococcus aureus, albus, citreus) cause septic inflammation. The points of entry are the skin or mucous membrane of the genitals on the one hand, their peritoneal investment on the other hand.

The opportunity for the invasion of the investing membrane is furnished by traumata, or by non-aseptic

operative manipulations or rough explorations (the sound, dilating instruments, etc.), or by puerperal processes.

Puerperal infections occupy a special place owing to the specific quality of the secretions, and the peculiar wound surface. This is particularly predisposed to the development of a virus introduced into it, since it is shut in, is favored by the heat of the body, there is stagnation of profuse secretion which is easily decomposed, and the large wound surface contains many open absorbent vessels.

The "gynecological" infections take the following course according to the point of entry:

Vulva.—Phlegmon of the vulva; the infection remains local and leads merely to the formation of abscesses; only infections of the perineum cause phlebo-thrombotic general infections, whose gravity increases in proportion to the proximity to the rectum of the original injury.

Vagina.—Croupous and diphtheritic kolpitis, vaginal phlegmon, abscesses, parakolpitis, and paraproctitis; the infection remains local and extends at most to the immediately surrounding connective tissue. Contrary to the rule in childbed, the process rarely invades the uterus.

Uterus.—Acute endometritis and acute metritis; the course is grave and the progress rapid.

Symptoms in progressive order: bloody and sero-purulent discharge, enlargement and painfulness of the uterus (felt as a dull pain in the depth of the pelvis; increased by movements, coughing, straining, etc.), vesical irritation, diarrhœa with violent tenesmus, pyrexia (rarely abscess formation).

The patient soon presents the appearance of profound infection; yellow complexion, a dull look, loss of appetite, tympanites, rise of pulse and temperature, sensitiveness of the abdomen—all symptoms of beginning parametritis and perimetritis.

Vaginal exploration shows sensitiveness of the vaginal fornix, resistance behind the uterus; rectal exploration reveals a tumor behind and beside the uterus, not to be differentiated by palpation, and consisting anatomically of pyosalpinx, oöphoritis, perimetrosalpingitis, peri-oöphoritis, and parametritis.

The process may remain stationary at this point, that is to say, the coils of intestine covering Douglas' pouch adhere together and thus shut off the peritoneal exudate from the upper abdominal cavity; a sacculated exudative peritonitis results, with gradual absorption or perforation into the rectum or more rarely into the vagina. Rigors occur now and then. Some resistance remains permanently alongside of the uterus.

The other symptoms to be noted are dysmenorrhœa, sterility, whose intra-uterine treatment may again set up febrile exacerbations, as may also the menstrual flow.

If the process extends, general peritonitis ensues, with marked tympanites, great pain throughout the abdomen, compression of the rectum, retention of flatus, grave symptoms of ileus, vomiting which may be fæcal.

The case terminates either fatally (the pyrexia being often as little marked as the anatomical alterations) or recovery ensues, rapidly with sudden perforation of the pus into some hollow organ or the

surface of the abdomen and collapse of the swelling,
or slowly by absorption.

Puerperal Fever.

Very different pictures are presented by puerperal
infections, since the changed circulatory conditions,
definite forms of lesions, typical physiological wound
surfaces and their secretions (see above) furnish dif-
ferent ports of entry and transmission for the mi-
crobes. Complicated morbid pictures result, whose
division, from the anatomical and bacteriological
standpoints, is not easy. Therefore I shall give here
the schematic outline, but in the description I shall
confine myself to the types familiar to the clinician.

Anatomical.

(1) Ulcers about the vulva, vagina, and cervix;
(2) Vulvitis, kolpitis, simple acute endometritis;
(3) Acute metritis and salpingi-
    tis,
(4) Parakolpitis and parametri-
    tis (pelvic cellulitis),   lymphangitis;
(5) Perimetro-salpingitis, peri-
    tonitis;
(6) Phlebitis.

Bacteriological.

(1) The pus cocci (see above) are present in the
secretion of the uterine cavity;

(2) The microbes develop in the wound surfaces
(gray ulceration);

(3) The microbes develop in the mucous mem-
branes;

(4) The microbes penetrate locally by the lymph vessels deeper into the connective tissue (parametritis);

(5) The microbes infect either in the same way or through the tube the peritoneum (peritonitis);

(6) The microbes penetrate rapidly with the blood into the whole body (general septicæmia);

(7) The products (sepsin, ptomaines) of the microbes (especially the germs of decomposition) penetrate into the blood channels (sapræmia);

(8) The venous thrombi entering the circulation as emboli are infected (pyæmia).

Clinically the following morbid pictures are known:

(1) Ulcers of the vulva, vagina, and cervix;

(2) Simple acute puerperal kolpitis and endometritis;

(3) Metritis and parametritis (parakolpitis);

(4) Metro-lymphangitis (perhaps salpingitis) and peritonitis;

(5) Sudden general puerperal septico-pyæmia;

(6) Sapræmia;

(7) Metro-phlebo-thrombosis.

(1) *Puerperal Ulcers of the Vulva, Vagina, and Cervix.*

These develop at the points where puerperal injuries are most frequent: on the nymphæ, at the posterior surface of the vestibule of the vagina, in the lower portion of the vagina, in the vaginal fornix, and at the external os. The excoriations and lacerations secrete even within the first twenty-four hours a thin pus, the base becomes yellowish-gray, and the

margins are reddened and painful. The affected parts are œdematous. Rarely the process extends deep into the connective tissue with phlegmons and abscesses. Phlebectasia and gonorrhœa furnish predispositions.

Symptoms and Diagnosis.—Pains, burning sensations in micturition, fœtid lochia, remittent fever with chills, ischuria. Ocular inspection is necessary.

(2) *Acute Simple Puerperal Kolpitis and Endometritis.*

Diagnosis.—The vaginal mucosa on examination with the speculum shows marked swelling of the papillæ, is swollen and red throughout, and bleeds easily. The lips of the os are tumid and œdematous, covered with readily bleeding and greatly swollen granulations. The vaginal portion and the cervical mucosa, which is likewise hyperæmic and secretes much muco-pus and blood, are covered partly with ovula Nabothi, partly with prominent nodules that when opened evacuate pus. In the rare cases examined post mortem the same condition is found in the endometrium, especially at the placental site.

The whole swollen mucosa is easily detached from the œdematous but well-contracted muscular tunic and contains ecchymoses.

Symptoms.—The lochia are fetid and remain bloody a long time; remittent fever (short chills followed by sensations of heat); long, painful after-pains; abdomen not sensitive, uterus but slightly so. Among the later symptoms are late hemorrhages (defective involution of the placental site) and transition into chronic endometritis and uterine displacements.

Etiology.—The condition is due to lesions such as catarrh preceding pregnancy; septic explorations during labor; the presence of decomposing remnants of the ovum.

Prognosis.—The fever lasts from one-half to one week, with a tendency to exacerbations and chronicity of the inflammation, which is apt to extend into the depth or to the tube and the perimetrium. The uterus is liable to subinvolution, with a long series of the troubles mentioned above.

Treatment.—See below under acute endometritis.

(3) *Acute Puerperal Metritis and Parametritis* *(Parakolpitis)*.

By metritis we understand an inflammation of the perivascular and interstitial connective tissue of the muscular tunic starting from lesions or ulcers of the uterine cavity and caused by the streptococcus pyogenes. The progressing inflammation reaches the connective tissue beside the uterus and in this way it extends in front alongside of the bladder into the extraperitoneal connective tissue of the abdominal walls or further to that of the thigh; or else laterally between the layers of the broad ligament to the sacral excavation; or else backward, bulging out Douglas' sac and ascending retroperitoneally along the ileopsoas muscles as high as the kidneys.

These processes are known as parametritis or pelvic cellulitis (pelvic phlegmon) and consist of a gelatinous swelling and round-cell infiltration of the connective tissue (see Plates 19, Fig. 2 and 44, Fig. 2). A considerable exudation forms and may attain the

size of a man's head. It is usually situated alongside of the uterus and slowly undergoes absorption. Firm callosities are left in the parametral connective tissue, which give rise to pathological fixation and displacement of the uterus.

Or the exudation may be evacuated externally through perforation: into the rectum, the vagina, bladder, through the sciatic foramen, along the inguinal canal, or directly through the abdominal walls (above Poupart's ligament). Recovery then follows. If the peritoneum yields, fatal general peritonitis is the result.

Symptoms.—In the first week after delivery there is usually considerable fever, with chilly feelings and pains in the abdomen. At the end of a few days the spread of the exudation is attended by pains in the loins and legs and interference with movement, occasionally disturbance of micturition. The often fetid lochia again become bloody on account of the impeded involution of the uterus.

The fever gradually becomes remittent, then intermittent, with frequent exacerbations. If it becomes hectic and is attended with frequent chills, an abscess has formed; the hectic type disappears when perforation takes place.

Diagnosis.—As soon as pain and fever set in, the tenderness of the abdomen and the condition of the lochia must be noted. The abdomen may be painful in a circumscribed place (as the result of local irritation of the peritoneum), but we do not find general, severe tenderness and distention of the abdomen, nor any intraperitoneal exudation. On the other hand, we can detect alongside the uterus at first tenderness,

later resistance, and finally a parametral tumor of doughy consistence.

Later the diagnosis is made easier by the fact that the exudation follows a track which does not correspond to the peritoneal distribution, viz., downward along the vagina, to Poupart's ligament, etc.

Prognosis.—The condition is rarely dangerous to life. Recovery takes place, on the average, in six to eight weeks. When abscesses form severe pains set in; the fever causes great exhaustion and slow convalescence.

Treatment.—When there is tenderness of the abdomen use an ice-bag, or Priessnitz's compresses; absolute rest in bed on the back; enemata. To cause absorption we recommend inunctions of blue ointment (1 gm. every two hours until salivation) or unguentum potassii iodidi. Fetid lochia and any ulcers of the vulva or portio vaginalis which may be present are treated in the manner described under the heading of acute endometritis. Fluctuating abscesses must be opened (abdominal walls, vagina, rectum).

(4) *Septic Metrolymphangitis, Acute Puerperal Salpingitis and Peritonitis.*

In almost all cases the point of entrance of the streptococci is found in grayish-yellow discolored ulcerations in the genital canal and purulent destruction of the placental surface. The path of infection commonly passes, on one side, from the ulcerated endometrium in the shape of swollen lymphatics and suppurating lymphatic glands in the muscular coat and then in the subserous tissue. The tissues under-

go purulent destruction, and the part of the serous membrane which is most prominent undergoes necrosis followed by peritonitis. The pelvis is filled by masses of exudation; the distended loops of intestines are adherent to one another. The fluid exudation passes beyond Douglas' cul-de-sac. All the organs may gradually take part in the infection; pleurisy and pericarditis may develop.

The process may also remain localized in the neighborhood of the first perforation of the peritoneum (partial peritonitis).

The virus may also pass along the lymphatics to the ovaries. walls of the tubes and bladder, and there give rise to abscesses. Peritonitis may also result from rupture of an ovary.

The virus may also be conveyed to the peritoneum from the inflamed tube, i.e., by endosalpingitis; the pus usually enters the abdominal cavity on both sides (pelveoperitonitis). The ostium abdominale may be closed; pyosalpinx then develops and may rupture later.

Symptoms.—A violent, protracted initial chill, soon followed by great tenderness of the entire abdomen, which is felt at every movement, on respiration and on palpation, especially of the large and firm uterus. Cerebral congestion (redness of the face, dizziness) which passes into somnolence with delirium and even into a maniacal condition are observed.

Rapid rise of temperature sets in with considerable increase in the rapidity of the pulse and respirations; and exudation into the abdominal cavity, recognizable by percussion. The abdomen is very tympanitic and distended, because there is an abundant

development of gas in the intestines (partly on account of the febrile paralysis of the muscular coat, partly on account of the inflammation of the bowels); tenesmus and vomiting are noticeable. The diaphragm is pushed upward, hence dyspnœa; later this is increased by the beginning pleurisy.

All the secretions are diminished. We find vesical tenesmus and concentrated urine (albumin!), constipation (followed by diarrhœa), diminished lochia (usually foul-smelling and rich in pus cocci, which infiltrate the decidua cells and blood corpuscles).

This acute form of lymphatic septic peritonitis often runs its course in a week and then gradually subsides, or it proves fatal from exhaustion. If the exudation is not absorbed and the patient does not succumb, the former will perforate into one of the viscera or externally through the abdominal walls.

A chronic course is pursued by partial peritonitis. This is due to the fact that the peritoneal affection is slowly progressive and is separated from the remaining part of the abdominal cavity by adhesive inflammation of the loops of intestines. This takes place, for example, as the result of ovarian abscesses. The peritonitis is pyofibrinous in character. It terminates in pathological fixations and displacements of the uterus and in chronic inflammatory processes (see Chronic Perimetritis).

Diagnosis.—This depends on the demonstration of the intraperitoneal exudation by percussion and rectal palpation (in addition to the tenderness and the abdominal tympanites). Perforations of the abscess are recognized by examination of the urine, fæces, etc.

(5) *Peritonitis Acutissima Puerperalis (Septico-pyœmia).*

If especially virulent germs pass suddenly into the abdominal cavity in large numbers (from rupture of the uterus, perforation of pus cavities, escape of septic pus from the abdominal opening of the tubes), the disease runs such a rapid course that an elevation of temperature does not occur and a cachectic condition develops at once. We then find extremely rapid pulse and respirations, with falling temperature, somnolence, rapid distention of the abdomen with considerable exudation, pains, hiccough and vomiting, diarrhœa, involuntary discharge of urine and fæces. The face rapidly grows pinched, but occasionally consciousness is unimpaired and euphoria is present. Death occurs in almost every case within twelve to forty-eight hours.

(6) *Peritonitis Gangrœnosa (Saprœmia).*

If a portion of the uterus becomes gangrenous from compression erosions or decomposition of the fœtus, or if there is perforation of encapsulated ichorous foci or of the intestine, the peritoneum will become converted into a brown, smeary mass.

Symptoms.—Rapid onset of meteorism, high fever, and somnolence. It usually develops after difficult spontaneous or instrumental labors attended by contusion of the soft parts.

(7) *Metrophlebothrombosis.*

In phlebothrombosis the thrombi, which physiologically occlude the vessels of the placental site, are

continued through the entire wall of the uterus into
the internal spermatic veins, are then thrown off into
the circulation, and pass into the organs as emboli.

If these thrombi have undergone putrid degenera-
tion or become pyogenic, the emboli will be carriers
of infection and give rise to septic metastases in the
spleen, kidneys, liver, lungs, joints, eyes, skin. This
condition is rarer than metrolymphangitis.

The peritoneum and pleura are not infrequently
affected.

Symptoms and Diagnosis.—Unexpectedly or after
slight signs of endometritis—with or without pains
or hemorrhages—a violent chill sets in, attended with
great elevation of temperature and followed by sweat-
ing. The abdomen is slightly tender in a circum-
scribed locality, but the uterus is decidedly tender
on pressure. This symptom of metastatic pyæmia is
repeated, is followed by severe headaches and pro-
nounced præcordial fear, and the patient rapidly loses
strength. Gradually the symptoms of the individual
metastatic affections set in. Death usually occurs
after two to three weeks of violent remittent and in-
termittent fever. A frequent secondary effect is
phlegmasia alba dolens from thrombosis of the veins
of the thigh. This is manifested by a whitish, tense
swelling of the integument of the thigh.

DIAGNOSIS AND TREATMENT OF ACUTE GENITAL INFLAMMATIONS.

1. Ulcers of the Vulva, Vagina, and Portio Vaginalis.

Diagnosis.—They occur chiefly in the puerperal
period, otherwise only in children or in very severe,

acute infectious diseases. They appear as croupous, diphtheritic, gangrenous vulvitis. The diagnosis is based on the fetid discharge, pains, slight rise of temperature, and the demonstration of a grayish-yellow membrane in fissures and wounds of the parts.

Treatment.—In all puerperal women who are suspected of having had a purulent uterine catarrh prior to pregnancy, prophylactic vaginal irrigations should be made with three-per-cent solutions of carbolic acid.

If ulcers are present they are cauterized for several days with ferric chloride and moist compresses are applied to the outer parts.

II. Kolpitis, Acute Endometritis.

Diagnosis.—Apart from the puerperal and gonorrhoeal inflammation described above, it may also be due to a cold with subsequent suppression of the menses, to septic operative procedures, or to acute infectious diseases. The chief symptoms are fever, purulent secretion, hemorrhages, and tenderness of the interior of the uterus. The portio is swollen (with erosions and ulcerations of the internal os) and is covered with purulent ovula Nabothi.

Treatment.—Rest in bed is indicated and also abstention from therapeutic interference with the organs; mild laxatives, Priessnitz's compresses, vaginal irrigations (warm, one litre; tube inserted high up, under slight pressure).

In puerperal kolpitis and endometritis, prophylactic vaginal irrigations are given. These are continued and, if the lochia retain a fetid odor and the uterus remains hard and painful despite the com-

presses and laxatives, they should be given hot (117.5°–126.5° F.) and finally combined with intra-uterine irrigations with a double canula (three per cent carbolic acid).

Attention must also be paid to ulcerations and the portio and cervical canal examined with the specu-lum. When necessary the treatment of chronic kol-pitis and endometritis must be adopted, in order to prevent chronicity of the inflammation.

III. Acute Metritis.

Diagnosis.—The disease begins with a chill and high fever, and tenderness of the enlarged, congested, and soft uterus. There is also tenderness on touch-ing the portio, and a dull pain deep within the pel-vis; tenesmus and pain in urination and defecation are observed. The formation of an abscess can only be detected by the fluctuation.

Treatment.—Prophylactically all disorders of men-struation are to be prevented, and asepsis must be secured during operations, therapeutic manipulations, the wearing of pessaries, etc.

To combat the inflammation we order an ice-bag, later Priessnitz's compresses, absolute rest in bed with the trunk low (flow of blood from the pelvis), mild laxatives (calomel 0.1–0.3, castor oil), warm va-ginal irrigations as in endometritis. If the pains con-tinue severe, narcotics may be applied locally.

Abscesses may only be opened when easily acces-sible. Other internal interference must also be avoided; this injunction includes exploration with sounds.

Puerperal metritis is also treated by rest in bed,

lowering of the trunk, the use of enemata and mild laxatives (calomel 0.5–1.5 pro die, castor oil, infusum sennæ compositum), ice-bags, and later Priessnitz's compresses. The latter are used so long as the abdomen is painful, but when the peritonitic irritation has subsided, we resort to unguentum cinereum (1.0 every two hours) or unguentum potassii iodidi; lukewarm or warm baths are indicated.

This treatment also holds good for the parametritis which is usually present. If a parametral abscess forms, it must be opened by incision at the site of fluctuation (vagina, rectum, abdominal walls above Poupart's ligament).

IV. Acute Septic Parametritis (Parakolpitis).

This occurs almost exclusively in the puerperal state; otherwise it follows non-aseptic operations.

Treatment: see remarks under III.

V. Acute Pelveoperitonitis (Metrolymphangitis, Salpingitis).

As soon as the abdomen becomes somewhat sensitive and the intestines are distended, we apply Priessnitz's compresses and give calomel (0.1–0.3) and enemata; vaginal and intra-uterine irrigations. The latter should be avoided in salpingitis in order to prevent contraction of the tubes. Any ulcers which may be present must be cauterized.

When pronounced peritonitic symptoms (increase of exudation, great tenderness, vomiting) are present, we should order several ice-bags to be applied to the abdomen so long as the fever continues. At the beginning we may give laxatives (infusum sennæ com-
12

positum and calomel, at first 0.2–0.5, later 0.05–0.1 at a dose). To relieve the meteorism, hydrochloric or sulphuric acid (perhaps oleum terebinthinæ, per rectum, 15–30 gm.) is given internally.

To relieve vomiting we administer pieces of ice, and give only fluid diet (soups, milk, eggs, scraped meat, the various peptone and hæmoglobin preparations, beef tea). Alcoholics are used freely: brandy with the yolk of an egg, champagne, red wine, in order to prevent heart failure. Other stimulants are also indicated, such as camphor internally and subcutaneously, ether, bouillon.

Mustard-plasters and dry-cups are employed to relieve pleuritic symptoms. To relieve exhausting diarrhœas we may prescribe aqua chlori and aqua destillata āā, one tablespoonful every two hours with mucilaginous drinks.

If the peritonitis is due to rupture of the uterus or vagina, the escaped parts of the ovum are removed and drainage through the rupture effected with iodoform gauze. Opium is here indicated.

If the mercurial treatment is to be employed more vigorously in addition to the calomel, 8.0 unguentum hydrargyri cinereum may be rubbed in daily until salivation sets in.

In the lymphatic form diaphoretics act favorably; for example, camphor and liquor ammonii acetatis, in addition to opium, and small doses of quinine and lukewarm baths; alcoholics and nourishing food are indicated.

Abscesses are opened by incision as soon as they fluctuate and push the vaginal or abdominal walls before them, and are then drained with iodoform gauze.

VI. *Septicæmia and Sapræmia.*

Septicæmia is treated with baths of 81.5°–86° F. (five minutes' duration) and the administration of alcoholics during and after the baths. In addition we should order nitrogenous, easily digested food, stimulating drinks, and excitants.

In sapræmia the decomposing focus (dead fœtus, remains of the ovum) must be removed without producing fresh lesions. Before and after this procedure, intra-uterine irrigations are made with three-per-cent solutions of carbolic acid (if necessary, cauterization of the interior of the uterus with concentrated carbolic acid is performed). Finally, iodoform tents or tampons of iodoform gauze are introduced.

VII. *Metrophlebothrombosis.*

Treatment.—Prophylaxis is extremely important and must be considered from several points of view.

1. The formation of large thrombi is to be avoided by removing all causes of uterine hemorrhage.*

2. Putrefaction of the thrombi is to be prevented by immediate energetic treatment of the puerperal endometritis, etc.

3. If putrefaction has occurred, further degenera-

* These include: 1. Imperfect contraction, either an irregularly distributed contraction of the uterus with moderate hemorrhage, or paralysis of the placental site alone with extremely profuse and dangerous hemorrhages. 2. Retention of parts of the ovum causes bleeding only in the first week, but decomposition is apt to give rise to putrid degeneration of the thrombi and secondary hemorrhages. 3. Slight but recurrent hemorrhages after the first week are due to atony of the uterus, to

tion and embolism are to be guarded against by act-
ing upon the contraction of the uterus, by disinfection
of the lochia, absolute rest in bed, the relief of con-
stipation, ischuria, or bronchial catarrh.

4. If emboli form in spite of treatment, the organ-
ism must be placed in condition to resist the me-
tastases by making the ptomains ineffective. We
order easily digested, nourishing food (every two
hours), refreshing drinks, alcoholics to maintain the
action of the heart (injections of ether and camphor
in heart failure), warm full baths or Priessnitz's
packs, cold rubbings and douches.

Mercury has been found useful in combating the
noxious action of putrid degeneration of the venous
thrombi (see the treatment of metrolymphangitis).

§ 16. CHRONIC SALPINGITIS.

Etiology.—For the definition and anatomy see the
description of Plates 18, 19, and 20. The most fre-
quent causes are puerperal and gonorrhœal inflam-
mations; not every endometritis extends to the tubes.

(*a*) *Parenchymatous tubal catarrh* (Plate 18, Fig. 1)
in atresia of the orifice; *hydrosalpinx.*

The secretion accumulates in the abdominal por-
tion, distends the walls, flattens the papillæ of the

imperfect involution, especially of the placental site. 4. The
atony is often induced by endometritis; this also acts by caus-
ing putrefaction of the thrombi and inflammatory hyperæmia.
5. Venous stasis also causes hemorrhages (distention of adjacent
organs, excessive exertion of the abdominal muscles (difficult
defecation, coughing), circulatory disturbances due to flexion
and displacement of the uterus.

Emotional excitement and sudden attacks of fever aid these
predisposing factors by causing acute hyperæmia.

mucous membrane and their cylindrical epithelium, separates the muscular fibres, and thus thins the walls of the tubes. The tube, which is held by the reduplications of the broad ligament, assumes a convoluted appearance; it is constricted in various places, as shown in Plate 20. The hydrops tubæ is sometimes discharged periodically into the uterus.

Symptoms.—Apart from menstrual disorders, sterility (the disease is generally bilateral), pressure symptoms and perhaps perisalpingitic pains, no noteworthy or characteristic symptoms are produced.

Diagnosis.—A round, tubular tumor, starting from the angle of the uterus, of the shape of a trumpet or ram's horn, enlarging peripherally and perhaps fluctuating, can be found by bimanual exploration so long as it is not surrounded by pelveoperitonitic masses of exudation. The demonstration of the corresponding ovary, in order to exclude a tumor of the latter organ, is also important.

Treatment.—It is only when the enlargement is very pronounced that we resort to laparosalpingotomy for the removal of the tubal sacs—or salpingostomy, *i.e.*, restoration of the permeability of the tube by stitching the serous to the mucous layers at the ostium abdominale, which has again been made permeable.

(*b*) *Parenchymatous and Interstitial Purulent Inflammation of the Tubes* (Plate 19, Fig. 1)—in atresia of the meatus; *Pyosalpinx* (Plate 18, Fig. 3 and Plate 20).

The tube is bluish-red in color and thickened not alone by passive dilatation but sometimes by proliferation of the muscular coat. The inflammatory process spreads through the ostium abdominale or

through the walls to the tubal peritoneum and then to the pelvic peritoneum (it always remains circumscribed on the peritoneum) and to the ovary. The organs adhere to one another as the result of the production of false membranes, which often contain depots of pus. Gonorrhœal inflammation is usually bilateral.

Symptoms.—These include pains to the side of the uterus, intensified during menstruation and on abdominal pressure. Sterility (see next section) is produced because the condition is generally combined with oöphoritis. Fever is present (in the gonorrhœal form only after exertion or excitement).

Prognosis.—Conception is impossible. Perforation peritonitis is always impending. Septic pyosalpinges rupture easily, but the gonorrhœal forms are not apt to rupture.

Diagnosis.—This is made by bimanual exploration. See the differential diagnosis of retro-uterine tumors under "Ovarian Cystoma" and Plate 62, Figs. 1 and 2, and Plate 43, Fig. 3.

Treatment.—We recommend laparosalpingectomy with stitching of the ovarian sac to the abdominal walls (Hegar, Kaltenbach) and pushing up the uterus from the vagina (Gusserow). If there is non-fixation of the pyosalpinx, its usually dangerous rupture may generally be avoided.

If there is distinct fluctuation in the vagina or the abdominal walls, free incisions and iodoform gauze drainage are employed in the corresponding locality (see Chronic Pelveoperitonitis).

§ 17. CHRONIC OÖPHORITIS.

In regard to the anatomy see the explanation of Plates 17 and 19.

Etiology.—Under the heading "Metrolymphangitis," mention has already been made of the acute puerperal suppurative oöphoritis which passes along the lymphatics from the uterus or tube.

Ovarian abscesses occur most frequently after purulent inflammations of the tubes. This oöphoro-

FIG. 28.—Senile Cirrhotic Atrophy of the Ovary.

salpingitis is combined with perimetrosalpingitis and perimetro-oöphoritis and perimetropyosalpinx; together with the encapsulated ovarian and peritoneal pus sacs, they form a large tumor (pyo-oöphorosalpinx). These processes are due to the purulent salpingitis which follows gonorrhœal mixed infection.

Sclerotic oligocystic ovarian degeneration (Plates 17, 19 and Fig. 29 in the text) may develop independently. In its final stage it leads to the destruction of all the follicles, so that the organ becomes hypertro-

phic, cicatricial, and firm from the new formation of chronic inflammatory connective tissue (Plate 20 and Fig. 28 in the text).

Symptoms.—We have to deal almost exclusively with a group of symptoms which derives its characteristic features partly from the so-called uterine phenomena of dysmenorrhœa, partly from hysteria.

A prominent part is played by the pains which radiate into the loins, deep into the pelvis, and toward

FIG. 29.—Oligocystic Degeneration of the Ovary.

the inguinal regions and thighs. At the menstrual period the flow is very irregular, sometimes oligorrhœic and amenorrhœic, sometimes menorrhagic. These pains are intensified; they are much less frequent in the intervals (dysmenorrhœic intermenstrual pain). The pains are aggravated by exertion and constipation, and they sometimes assume a colicky character (tubal colic).

Diagnosis.—By means of bimanual exploration the pains can be localized in the appendages; the tube is swollen, the ovary is enlarged. In regard to palpa-

tion of these organs see the description of Plate 40, Fig. 1. The ovary is often fixed and displaced, usually downward and behind the uterus (see Plate 61, Fig. 1).

We should not be led astray by the tenderness of those parts which are pressed upon during palpation. For example, the abdominal walls are sensitive in lumbo-abdominal neuralgia, and in the central hysterical affection which may be associated with an unchanged ovary (Charcot's ovarie).

In perimetrosalpingitic processes the various organs cannot be distinguished from one another.

Treatment.—Avoid all injurious influences of a congestive character and order absolute rest (rest in bed, sexual abstinence); the securing of regular easy stools and micturition is important.

Removal of the cause involves treatment of the uterine inflammation and vaginal irrigations, but no intra-uterine treatment should be adopted.

To relieve the pains we resort to the ice-bag, horizontal position, Mayer's round ring (the lever pessaries press upon the diseased appendages), tamponing of the vagina or fornix with iodoform tampons, or derivative treatment.

The ice-bag may be replaced later by Priessnitz's compresses and warm baths. In a few cases good effects are obtained from hot vaginal irrigation (117.5°–122° F.) or hot sand baths.

If the pains are intolerable we may remove one or both ovaries, usually with the corresponding tube, but not in those cases in which the ligaments consist only of rigid, callous tissue. These tissues are often the site of the pains and are inaccessible to opera-

tion. But ovariotomy is only indicated after treatment for years has proven useless.

After all subacute symptoms (occasional chilly feelings, great tenderness) have disappeared, massage may be used.

§ 18. CHRONIC PERIMETRO-OÖPHOROSALPINGITIS AND PELVEOPERITONITIS.

In regard to the anatomy see the descriptions of Plates 17 and 20; 33, Fig. 1; 36, Fig. 2; 42, Fig. 1; 63, Fig. 1.

Etiology.—In the majority of cases of chronic pelveoperitonitis the tube is the organ of transmission of the usually gonorrhœal mixed infection, owing to the escape of minute amounts of serum, mucus, or pus from the ostium abdominale. The infection can also take place through the medium of the lymphatics. Genital tuberculosis is a frequent cause.

Serous tubal catarrh corresponds to serous perimetosalpingitis, purulent salpingitis to purulent pelveoperitonitis saccata. Suppurating tumors, for example dermoids, may also act as a cause.

Symptoms and Prognosis.—With the escape of the pus a violent pain in the pelvis suddenly develops, attended by chill, vomiting, distention of the abdomen, pinching of the features, and a small pulse. This is followed by high temperatures and remittent fever. Interference with micturition and defecation occurs from pericystitis and periproctitis. If the abscess bursts into the bladder, severe pains and purulent cystitis set in.

When the exudation becomes encapsulated, the

fever diminishes, but as soon as perforation of pus into a viscus is impending the chills recur. The signs are intestinal tenesmus, pressure downward, pains in the bladder, stinking stools and urine.

When perforation takes place, the process is by no means at an end. Periods of euphoria and chills (hectic fever) with escape of pus now alternate with one another and the patient gradually loses strength. In rare cases a fatal termination ensues at once on account of perforation into the abdominal cavity.

In the relatively favorable cases the encapsulated exudation is absorbed (peritonitis indurata), but the numerous adhesions (false membranes) and resulting displacement and irritation of the organs induce severe and permanent morbid disturbances (sterility, abortion, extra-uterine pregnancy, hysteria, menstrual colic, menorrhagia, leucorrhœa, pronounced visual disorders). The gonorrhœal inflammation constantly returns.

Diagnosis.—Apart from great tenderness of the abdomen and fornix, bimanual exploration shows especially pronounced tenderness on moving the uterus.

The existence of adhesions is shown by the impeded mobility of the uterus or its fixed position on reposition (see "Displacements of the Uterus" and the corresponding plates).

The exudations never occur without peritonitic pains, fever, etc. They are usually found in Douglas' cul-de-sac, which they push deep downward. At the start they can be felt from the posterior fornix or the rectum as a tender, resisting mass; the fornix is either depressed or elevated. Apart from the exuda-

tion the appendages are also included in the encapsulation (see retro-uterine tumors under "Ovarian Cystoma"). In other cases the exudation extends to the umbilicus. If Douglas' sac is obliterated, the exudation will be found above the superior strait; for example, on the iliac fossa.

Treatment.—For treatment of the acute form see "Metrolymphangitis." Treatment of the chronic form: every therapeutic manipulation of the genitals is contraindicated; this includes the introduction of pessaries, intrauterine sounds, scarifications of the portio, thorough bimanual exploration, etc.

Uterine catarrhs are let alone; abscesses are not opened until they threaten perforation. Frequent periods of rest, sexual abstinence, and easy evacuations from the bowels must be secured. To relieve the pains we order horizontal decubitus, Priessnitz's compresses, lukewarm vaginal injections of mucilaginous or narcotic solutions, the introduction of anodyne suppositories (cocaine, extractum belladonnæ, morphine). Later, warm sitz baths (95° F. and gradually cooler) are indicated.

To induce absorption we prescribe hot vaginal injections (117.5°–126.5° F.), absorbents, such as potassium iodide, ichthyol, iodoform, glycerin tampons, bog baths and compresses, sool baths (Kreuznach, Nauheim, Oeynhausen, Toelz). To stretch the false membranes we employ at first rectal injections (according to Hegar, the amount and duration should be increased gradually, the temperature diminished); later massage, when there is entire absence of sensitiveness (see explanation of Plate 63).

In tuberculous peritonitis simple kœliotomy, with

or without the application of iodoform to the serous membrane, is indicated.

In gonorrhœal peritonitis we should remove the pyosalpinx and diseased ovaries, so far as the tumor can be enucleated. If pelvic abscesses cause constantly increasing impairment of the general condition, they must be enucleated or free vent given to them. The best view is obtained by kœliotomy. Then we must decide whether the abscess cavity is to be opened and drained from the vagina or whether the sac is to be stitched to the opening in the abdominal walls and opened in this way.

The posterior fornix of the vagina may also be opened directly in layers and the thickened peritoneum stitched to the vaginal mucous membrane. In operating from the rectum there is danger of decomposition.

After perforation into the bladder the production of a vesical fistula by the high operation or the vagino-vesical incision may come into question.

When there are hard callosities which contain pus and are accessible with difficulty from the abdominal walls, the uterus is resected per vaginam, with or without a vaginal fistula, and drainage established.

§ 19. CHRONIC PARAMETRITIS (PHLEGMON OF THE BROAD LIGAMENT) AND PARAKOLPITIS.

There are two forms:

(a) A chronic process which develops out of the acute parametritis described above, and (b) chronic atrophic parametritis (Freund).

Etiology. — In regard to (*a*), see § 15. (*b*) This
form is due to excessive irritation of the genital
nerves with protracted vital losses (rapidly following
pregnancies with lactation in the intervals, sexual
excesses). The base of the broad ligament is the
starting-point of a cirrhotic connective-tissue change,
which follows a periphlebitic process. It resembles
a cicatricial atrophy and gradually involves the entire
genital tract in the atrophic process.

Symptoms and Diagnosis. — (*a*) The course of the
acute parametritis, which has become chronic, may
be such that the exudation persists for months and
years; or it perforates, but is not evacuated entirely
because the tissue is only partially disintegrated;
or absorption soon occurs and is attended with re-
traction of the connective tissue. These retractions
also occur, without septic influences, as simple for-
mation of cicatrices in interstitial lesions which have
developed during labor. Displacements and distor-
tions of the uterus and its appendages are the results
of this condition (see §§ 9–11 and Plates 33–36; 43,
Fig. 1; 44, Fig. 2, and 63). Callosities and masses
of exudation, close to the fornix and usually along-
side the uterus are demonstrable, or there is short-
ening of the sacro-uterine ligaments. They are less
sensitive than perimetritic exudations, and interfere
with the mobility of the uterus.

(*b*) The symptoms of chronic atrophic parametritis
include pelvic pains, spontaneous and on pressure,
and pains in the bladder and rectum, when the con-
nective tissue surrounding them is involved in the
process of retraction. There is impairment of the
sexual functions (oligorrhœa and dysmenorrhœa) with

nervous irritability, depression, hysteria. The general nutrition is impaired.

The organs can be moved only with great difficulty in the painful, firm connective tissue.

Treatment.—(*a*) Of chronic septic parametritis: the abscesses are opened when fluctuation occurs and the integument or vaginal mucous membrane is pushed forward. This process may be aided by means of warm compresses. Absorption is favored by the measures recommended under the head of chronic pelveoperitonitis, viz., the use of potassium iodide, glycerin, ichthyol, iodoform, hot vaginal injections, Hegar's rectal irrigations, bog baths and hot sand baths, massage, elastic traction by means of a forceps applied to the portio. No intra-uterine operations are permissible.

(*b*) In the treatment of atrophic parametritis we must rely on hot vaginal douches, sitz baths, and massage.

§ 20. GENITAL TUBERCULOSIS.

Definition and Etiology.—The causal agent of this disease, viz., the tubercle bacillus, may infect the genitalia primarily or secondarily; the latter occurrence is the more frequent. On the whole, genital tuberculosis is rare. A previous gonorrhœal, septic, or mixed infection is a favoring factor.

It develops primarily from cohabitation with a man suffering from genital tuberculosis, from an infecting digital exploration, from infected underclothes, etc.

It develops secondarily through the circulation, for example, from the intestines or lungs through the lymphatics; or from infection of the tube (most fre-

quent) from the peritoneum, or from adhesion to a tuberculous loop of intestine.

The following indicates the relative frequency of localization: The convoluted, immobile tubal mucous membrane is affected most readily; thence the process is apt to extend to the ovaries, much more rarely to the mucous membrane of the body of the uterus. It is evident that the menstrual renewals of tissue exert an unfavorable influence on implantation of the virus. The cervical and vaginal mucous membranes are affected very rarely, partly on account of the secretory conditions of the former, and the dense epithelium of the latter. Here, as in the vulva, fissures alone form the port of entry for the primary invasion of the bacilli.

Tuberculosis of the vesical mucous membrane following general and genital tuberculosis is not more frequent.

Anatomy.—There are four varieties of the disease: (1) General peritoneal tuberculosis, which also involves the serous lining of the genital apparatus; (2) tuberculosis of the tubes, ovaries, and corpus uteri; (3) the very rare affections of the cervical and vaginal mucous membranes; (4) the lupoid vulvar forms.

After chronic and subacute inflammatory symptoms (ascites, serofibrinous exudation, formation of false membranes) the peritoneum becomes covered with tubercles. As a result of the adhesions the tubes are fixed alongside the uterus in Douglas' cul-de-sac and both ostia are occluded, so that the purulent cheesy secretion cannot be evacuated. Pyosalpinx develops with the characteristic nodular shape of a ram's horn.

The walls are reddened, thickened, and infiltrated with yellowish, translucent tubercle granulations.

Microscopically the cylindrical epithelium is found fairly intact at first, but here and there the cells are swollen and undergo mucoid and granular degeneration. But finally the cells are covered with a cheesy layer beneath which is found granulation tissue with giant cells, which also infiltrates the muscular coat. The vessels undergo chronic inflammation and exhibit hyaline changes. Koch's bacilli are demonstrable but they are few in number.

In uterine tuberculosis the wall is thickened by the œdematous muscular layer, while the mucous membrane is entirely destroyed and converted into a cheesy or milky purulent mass; here and there are found tubercle granules. The ulcerative process is sharply limited at the internal meatus.

Tuberculosis of the vagina and cervix also exhibits a jagged and ulcerated appearance, is surrounded by granulations, and produces a smeary, yellow deposit.

Lupus vulvæ begins in the shape of reddish, flat, small tumors, chiefly on the labia, which ulcerate; they do not secrete so freely as syphilitic ulcers and do not spread so rapidly, but exhibit more diffuse induration. The cicatrices are reddish-violet in color. Microscopically we find no hypertrophy of the papillæ and cutis but a small-cell infiltration around the vessels.

Vesical tuberculosis occurs as a tuberculous infiltration or in the shape of ulcerations.

Symptoms and Diagnosis of the tubal affection are the same as in salpingitis or pyosalpinx.

13

Uterine tuberculosis produces symptoms analogous to those of ordinary metritis, but the organ increases in size much more rapidly and markedly; the discharge is cheesy. An exploratory curettage should be performed in order to make a differential diagnosis from carcinoma of the body of the uterus. The recognition of tuberculous tissue is not easy and depends on the presence of giant cells, of tubercles in the shape of connective-tissue granules in the stroma, and the demonstration of bacilli (when necessary, inoculation of the peritoneal cavity of a rabbit with uterine fluid). A very important fact is the coincident condition of the tubes.

At the beginning of the disease amenorrhœa is a striking feature, interrupted occasionally by bloody, watery, or muco-purulent discharges. There is a feeling of weight and pressure in the pelvis.

In vulvar, vaginal, and cervical tuberculosis the diagnosis is based on the demonstration of bacilli, upon the above-mentioned microscopical lupus findings, and upon the general condition.

Peritonitis: ascites of high specific gravity, and straw-yellow color; an exploratory incision shows confluent tubercles. Caution is necessary, however, because there is also a non-tuberculous chronic peritonitis which is attended by the development of confluent granules.

Prognosis.—As in tuberculosis of the uropoëtic system the disease is always fatal unless the primarily infected organs can be extirpated. Sufficient experience in these cases is still lacking.

Treatment.—Successful extirpation is possible (Hegar, Werth, Péan) if the disease is confined to the

tubes and uterus, if there are no tuberculous peritoneal false membranes, and if the general condition, particularly that of the lungs, warrants an operation.

If the tubes alone are diseased, they are removed with the ovaries by cœliotomy. The abdominal cavity is protected against infection by elastic ligatures and by drawing the tumor out of the abdominal wound. In uncontrollable hemorrhage an iodoform gauze tampon of Douglas' sac through the opened posterior vaginal fornix (Wiedow) should be employed.

If the uterus is also affected it should be removed. The organ is removed through the vagina only when the former is not too large.

If there are contraindications to such operations the pyosalpinges are evacuated through the vagina and drained with iodoform gauze; the uterus is curetted and the injured mucosa dusted with iodoform powder (iodoform blowers).

In vaginal ulcers and vulvar lupus we recommend removal of the diseased parts with the knife and by means of cauterization with the actual cautery, fuming nitric acid, caustic potash. Then the parts are dusted with iodoform.

In peritoneal tuberculosis cœliotomy is indicated.

Ulcers of the bladder should be excised after the high incision.

§ 21. Venereal Diseases.

1. Soft Chancre.

Diagnosis.—These round, sharp-edged ulcers appear one to four days after infection, chiefly upon the vulva; more rarely in the vagina and portio vaginalis

at the site of an itching vesicle or a fissure. The
ulcer is covered with pus, lardaceous, soft; its edges
are undermined, soft, and reddened. Occasionally
the ulcer is diphtheritic or it extends rapidly (ulcus
gangrænosus), or it heals in the centre but spreads
peripherally in a serpiginous manner.

The infection remains local and extends only to the
inguinal glands, which suppurate (chancrous buboes)
and become very painful.

Treatment.—The ulcer must be destroyed with
lunar caustic, fuming nitric acid, or chromic acid;
then antisepsis is carried out. The buboes are opened
freely, enucleated if necessary, and dusted with iodo-
form powder.

2. *Hard Chancre* (*Lues*).

Diagnosis.—The primary lesion is a small, single
ulcer, following a papule which develops three to four
weeks after infection. It does not heal nor does it
grow larger, but has a hard infiltration at the periph-
ery. The ulcer is located most frequently at the pos-
terior commissure.

The secondary affection consists of indolent, multi-
ple buboes in the inguinal region, which do not sup-
purate. Next, the abdominal lymphatic glands are
infected, etc.

Upon the vulva and around it as far as the thighs
and the anal fold may be found secondary prolifera-
tions of the same structure as the primary papule,
viz., condylomata lata (dense alveolar infiltration of
the cutis with multinuclear cells; chronic inflamma-
tory thickening of the walls of the vessels with nar-
rowing of the lumen).

Tertiary syphilides of the genitalia are very rare; gummata occur chiefly in the vagina and alongside the portio vaginalis. As they degenerate rapidly, they are apt to simulate the shallow, ulcerating vaginal cancroid.

We need not enter into the treatment as this forms part of syphilidology.

§ 22. VESICAL CATARRH AND CYSTITIS.

Anatomy.—Vesical catarrh occurs in an acute or a chronic form. The latter develops from the former or from a protracted hyperæmia. The latter gives rise to losses of blood, either as ecchymoses into the mucous membrane or as hemorrhages into the bladder.

In acute catarrh the mucosa is very red and the organ contracted. The epithelial cells are exfoliated in places and their débris, together with emigrated red and white blood corpuscles, are found between the folds of the wrinkled mucous membrane.

If the inflammation has become chronic, there is vivid redness of the entire mucous membrane or the congestion is partial, in little islands (for example, often around the internal urethral meatus, associated with small ecchymoses). The dilated vessels permit the escape of numerous leucocytes; the surface of the mucosa secretes a good deal of mucus and its pavement epithelial cells are desquamated in masses.

Leucocytes still continue to emigrate for a long time after the catarrh subsides. Otherwise, permanent excoriations develop and, under the influence of bacteria, are converted into ulcers (most frequently at the trigonum and the urethral opening); finally the muscular coat is also affected.

The initial infiltration of the muscular coat leads either to acute extension of the inflammation, to acute cystitis proper, and then to pericystitis (*i.e.*, inflammation of the subserous and serous layers), or to chronic parenchymatous hypertrophy of the muscular coat; the entire wall of the bladder is then thickened and rigid.

The peritoneum usually reacts and thus prevents the passage of urine into the abdominal cavity; if not, extremely acute peritonitis and a fatal termination set in. This pernicious course is preceded by progressive gangrene. When confined to the mucous membrane the necrosis leads to exfoliation *in toto* or in shreds (cystitis diphtheritica, see Plate 55, Fig. 2 and "Atlas of Obstetrics," Fig. 85).

Etiology.—In many regards the mode of development of the inflammation is essentially different from that of cystitis in man. On the one hand, the shortness of the urethra permits the much more ready entrance of the inflammatory agents into the bladder. On the other hand, this same peculiarity protects woman against chronicity of the urethritis and its results (strictures), and furthermore against the retention of concretions (vesical calculi as large as a cherry may pass the urethra and larger ones are easily removed by operation). In like manner there is absence of the prostate gland, whose hypertrophy gives rise to stasis and decomposition of urine. The puerperal processes entail an entire series of injurious influences, which consist partly of direct pressure (contusions, fistulæ), partly of inflammations which extend directly from a perimetritis or a parametritis, or spread to the bladder through perforation of an

exudate. An extra-uterine fœtal sac may also empty its contents into the bladder (see "Atlas of Obstetrics," Fig. 115). A predisposition is also due to the frequency of perforating tumors of the female genitalia (carcinoma, see Plates 54, 55, and 58; dermoid cysts).

Another group of morbid factors causes retention of urine, for example, incarceration of the retroflexed gravid uterus (see "Atlas of Obstetrics," Fig. 85), impacted retro-uterine tumors and cystocele in vaginal inversion. '

The two most frequent causes are direct infection by unclean catheters and gonorrhœal urethritis.

Causes which are located in the bladder itself are tumors of its walls (Plate 57, Fig. 5) and vesical tuberculosis.

Bacteria are implicated in all vesical catarrhs; they cause decomposition of the urine only after a lesion of the walls. Then the decomposed urine in turn reacts upon the mucous membrane. The catarrh is maintained by irritating constituents of the urine, such as alcohol, cantharides, etc.

Symptoms and Diagnosis.—There is frequent desire to urinate, with burning during micturition, and painful tenesmus on voiding the last drop. The urine is sometimes bloody, constantly more or less mucous or muco-purulent (thick, white sediment), opaque, and has a penetrating ammoniacal odor.

Microscopically we find red and white blood globules and desquamated pavement epithelium; the urinary crystals mentioned in § 12, pp. 133, 134, are found in alkaline fermentation.

Diphtheritic cystitis is recognized by the great

tenderness of the bladder, fever, and desquamation of membranes or shreds which may interfere materially with catheterization. If these membranes give rise to pronounced ischuria, symptoms of retention of urine (beginning uræmia) set in, viz., dyspepsia, nausea, vomiting, alternating constipation and diarrhœa, rush of blood to the head.

Hypertrophy of the bladder gives rise gradually to considerable dilatation; even after micturition the bladder can be felt above the symphysis. In old age such bladders become almost as thin as paper, after the disappearance of the muscular hypertrophy. Both forms may be demonstrated by the aid of the catheter.

After the diagnosis of cystitis is made, we must ascertain its cause. This may be located in the bladder itself, for example, ulcers and lesions, tumors, calculi, and foreign bodies. On the other hand, an entire series of neoplasms, especially in the urethra, are due to inflammatory irritants. This is also true of ulcers and fissures of the neck of the bladder, especially at the internal meatus of the urethra and in the urethra itself. These are extremely sensitive and are often produced by the catheter (even an elastic one). Like catarrh and certain of its causes, these fissures also give rise to

The Sequelæ of Cystitis.

1, Spasm of the bladder (cystospasmus); 2, paralysis of the bladder (ischuria, incontinentia, ischuria paradoxa).

1. Spasm of the bladder is a neuralgia and occurs in nervous women either in combination with vesical

catarrh and all irritative conditions of the bladder
(foreign bodies, calculi, ulcerations and fissures, tu-
mors) or it develops as a primary neuralgia under the
influence of strong irritants combined with a very
excitable nervous system. It resembles vaginismus
and may be associated with it; possibly irritative
conditions of the internal genitalia may act as causal
factors of the former as they do of the latter. Such
irritations include excessive sexual intercourse, onan-
ism, perhaps violent emotions, colds with subsequent
chronic hyperæmia. Under such primary conditions
irritating food and drink may also give rise to an
attack.

Symptoms and Diagnosis.—Violent pains in the
bladder occur in paroxysms lasting from a few min-
utes to several hours. The pains radiate from the
neck of the bladder and at times, especially at the
beginning of micturition, assume an extremely severe,
spasmodic character. The spasm may be so violent
that the urine cannot be voided (ischuria spastica).
When complicated with vesical catarrh the urine is
cloudy and contains red and white blood globules and
mucus; in a pure neurosis it is clear as water (urina
spastica). The urine is voided sometimes in large
amounts, sometimes in drops, and micturition gives
rise to pains radiating into the thighs and other parts,
to tenesmus of the bowels, nausea, protracted dyspep-
sia, and malaise, so that finally the general nutrition
is notably impaired. The paroxysms occur at irreg-
ular intervals and the disease may last for years.

The main point in diagnosis is the determination
or exclusion of the causal factors. Bimanual explor-
ation (palpating between the vagina and symphysis)

informs us concerning the presence of calculi, tumors, or hypertrophy of the bladder; the combination of the sound and the exploring finger in the vagina discloses definite sensitive spots (fissures) or small diverticula (if inaccessible to the catheter they constantly reinfect the urine). Dilatation of the urethra with Simon's speculum, digital exploration and inspection of the interior of the bladder (cystoscopy, endoscopy) will reveal tumors and large ulcers.

2. Paralysis of the bladder may be of two kinds, viz., paralysis of the longitudinal and oblique muscular fibres which empty the bladder (ischuria, retention of urine), or paralysis of the circular fibres which retain the urine (paralytic incontinence). Both forms may be combined, *i.e.*, the urine escapes in drops and cannot be retained (incontinence) after the desire to pass urine has already disappeared (ischuria).

If there is no paralysis of the sphincters in combination with the ischuria, the bladder, after it has been excessively distended (dilatation of the bladder) begins to overcome the resistance of the sphincter muscle and discharges the urine in drops. This does not materially diminish the size of the organ, and the patient has no suspicion of its distention (ischuria paradoxa).

These conditions develop after puerperal processes from displacements of the bladder, flexion of the urethra, inflammation of any parts of the genitalia or their serous lining—also from changes in the elasticity of the muscular walls (fatty degeneration, atrophy) due to cystitis, habitual distention of the bladder, old age, acute infectious diseases; finally from impaired innervation, as in spinal-cord diseases and

other central nervous affections, such as apoplexy and neurasthenia, in feeble individuals, for example, in the form of nocturnal enuresis, etc.

Symptoms and Diagnosis.—Ischuria paralytica is manifested by the difficulty of urination; the abdominal pressure is brought excessively into play. In making a diagnosis we must ascertain the cause accurately; particular attention must be paid to urethral tumors. When there is incontinence of urine we must determine, by means of the catheter, whether we have to deal with ischuria paradoxa.

Treatment of Cystitis.

The treatment of recent gonorrhœal urethritis and cystitis has been discussed in § 12.

In simple acute vesical catarrh (without fever) the bladder is left undisturbed and treatment is merely intended to make the urine bland. This is done by the abundant ingestion of tea and milk (if necessary, the addition of 25 gm. lime water to $\frac{1}{2}$ litre milk), abstinence from all irritating food, especially from alcoholic stimulants. Bland diet includes the yolk of egg, milk of almonds, bouillon, and lean meat. Easy stools must be secured by enemata and mild laxatives.

Internally we may give solution of potassium chlorate or solution of salicylate of sodium (5–150).

Tenesmus is treated by rest in bed, Priessnitz's or warm compresses, narcotics in the shape of vaginal or rectal suppositories (chloral hydrate, tinctura thebaica, morphine, extractum belladonnæ) or internally (chloral hydrate, morphine). The vesical mucous membrane itself does not absorb drugs.

In severe and chronic infectious cystitis the treatment just described is supplemented by irrigation of the bladder. For disinfection we may recommend 0.02–0.03 per cent boric acid, 0.3 per cent salicylic acid, 0.03 per cent corrosive sublimate, 0.25–1.0 per cent carbolic acid, 0.2–0.6 per cent nitrate of silver. To relieve the pain after stronger injections we may follow them up with injections of 0.25 per cent cocaine; after using nitrate of silver, this may be precipitated by a 5-per-cent solution of table salt.

The irrigations may be made with a catheter or still better with Küstner's funnel (which I am fond of using on account of the ease with which fissures are apt to form during catheterization). No air must be included and the apparatus must be kept strictly antiseptic, $\frac{1}{4}$–1 litre, at a temperature of 90.5° F., must be applied one to four times a day, under not too high a pressure when the detrusor muscle is paralyzed. In cases of high fever the irrigations may even be made every two hours.

The most rapid effects are obtained from the permanent, immediate evacuation of the urine from the bladder—always to be employed in cases of fissure and severe cystitis. According to Fritsch's method, a rubber tube 15 cm. long and 0.6–0.7 cm. in thickness is introduced and held in position by a suture, but is inserted just far enough to permit the discharge of urine. It must be changed every three days on account of the incrustation.

Diphtheritic membranes must be removed; their presence may be diagnosed from the numerous incrusted, small shreds of tissue and the ichorous, bloody condition of the urethra. In order to remove

them the urethra is dilated by means of Simon's specula. Of the seven numbers only the first three are introduced in regular order and irrigation is made in No. 3. In hemorrhages we use liquor ferri sesquichloridi (1:800), ferripyrin.

The after-treatment consists of the continuance of bland diet, carbonated waters, such as Wildungen, Vichy, etc., or weak tea.

Hypertrophy and retraction of the bladder are treated with regular catheterization and lukewarm irrigations, which are increased daily in amount (in order to produce distention), cold baths, douches, and vaginal irrigations.

In vesical spasm we must remove the cause, attention being paid to fissures at the neck of the bladder or in the urethra. In such cases we employ Fritsch's permanent catheter or dilatation of the urethra.

Congestive conditions are to be relieved by enemata and mild cathartics; abstinence from sexual intercourse; hot foot baths; bland diet without alcoholics.

To relieve the nervous excitability, give potassium bromide.

During the paroxysms chloral hydrate is indicated internally and by rectum or vagina; if necessary, a morphine injection directly into the bladder or irrigation with a cocaine solution may be used, also the above-mentioned remedies against tenesmus.

In paralysis of the bladder, so far as the paralysis of the sphincter is concerned, the exercise of the will plays an important part; for example, in nocturnal enuresis (the patient should be awakened several times a night in order to micturate).

In ischuria (detrusor paralysis), frequent catheterization and cool compresses are indicated.

If the muscular coat is paretic or paralyzed (incontinentia paradoxa paralytica) it must be treated with electricity, one pole (a catheter well insulated with rubber) being placed in the bladder, which has been filled with water, the other upon the symphysis, loins, or on the perineum.

We may also resort to catheterization, lukewarm irrigations, cool baths, and the treatment prescribed for catarrh.   The treatment of catarrh is also usually the best means of relieving these special symptoms.

CHAPTER II.

DISORDERS OF NUTRITION AND CIRCULATION.

(Exanthems, Phlebectasiæ, Neuroses.)

As the female genitalia, especially the vulva, are unusually rich in lymphatics and blood-vessels (in the shape of cavernous tissue) and also in secretory organs and nerves, affections of one system extend immediately to the others.   This gives rise to the most manifold changes, which usually form typical symptom complexes (pruritus vulvæ, vaginismus, dysmenorrhœa, hysteria).

§ 23. DISORDERS OF NUTRITION AND CIRCULATION.

(a) *The External Genitalia.*

Pruritus vulvæ is an inflammation of the external genitalia attended by violent itching.   There are different forms of vulvitis: simple redness (*dermatitis*

simplex); the corium and subcutaneous connective tissue are diffusely implicated (*phlegmon* of the vulva with abscess formation); these parts are implicated only partially (*furunculosis*); the sebaceous glands are inflamed and exhibit yellowish, small projections (*folliculitis*); inflammation of the vascular connective-tissue papillæ, showing small reddish prominences (*papillary vulvitis*). There is also a diabetic vulvitis.

Among the cutaneous eruptions eczema, herpes, prurigo, and miliaria occur in rare cases.

Treatment.—To relieve simple inflammations we order washing with a solution of soda, followed by compresses of 2 per cent carbolic acid, 20 per cent borated vaseline, or 10 per cent carbolized oil; sitz-baths. If these remedies cause burning, use lead wash and zinc ointment.

In more severe inflammation we resort to washing with soda, then application of a five-per-cent solution of nitrate of silver, followed by carbolic-acid compresses. When abscesses form they must be incised. In furunculosis, shave the mons veneris, then apply Unna's mercurial plaster, later order warm sitz-baths, soap plaster, emollient poultices.

In diabetic vulvitis the primary disease must be treated with meat diet and laxatives.

In folliculitis, withdraw the fat from the cutis by means of solutions of carbonate of potassium. A piece of soda as large as a walnut is dissolved in water and applied, to be followed immediately by cauterization with a five-per-cent solution of nitrate of silver. The parts which produce pruritus should be removed. To relieve pruritus, we wash with soda, cauterize with a 10-per-cent solution of nitrate of silver and

apply 10-per-cent carbolic-acid compresses. If necessary, we may use ice-water compresses, 0.03 per cent to 1.0 per cent corrosive-sublimate or salicylic-acid compresses, 20 per cent borated vaseline, or 0.03 per cent salicylic-acid ointment. Further, warm sitz-baths, to which may be added three-fourths of a pound of bran, a decoction of oak bark or other astringents (alum, tannin). Finally resort may be had to anodynes, such as cocaine, chloroform, morphine, belladonna.

(b) *The Internal Genitalia.*

Vaginismus is a symptom complex similar to pruritus with which it may also be combined. It is a spasmodic contraction of the introitus vaginæ which is excited, in a reflex manner, by contact with the vagina, or with the extremely hyperæsthetic, usually thickened, and chronically inflamed hymen, or its carunculæ myrtiformes. That central hysterical processes also play a part is shown by the fact that the gentle touch of the smooth handle of an instrument acts as violently as the impetus of coitus or the introduction of a speculum. In one of my patients the insertion of the irrigation tube was effected easily and painlessly when done by herself, but was attended with violent pain when done by another. In like manner a tampon could be introduced if her attention was diverted. The mere thought of remarriage and coitus also gave rise to the pain. There may also be vaginismus without pain, as is shown by the symptom of "captive penis." On the other hand there are vaginal neuroses, *i.e.*, painful places, which are situated higher.

Treatment.—This consists of careful excision of the entire hymen, including the urethral meatus with its caruncles. In the case mentioned above, the nymphæ were also removed on account of pruritus.

If the sensitiveness still persists, the constrictor vaginæ is forcibly dilated. Digital exploration now demonstrates the insensibility to the patient, and the normal exercise of cohabitation and the occurrence of pregnancy relieve whatever slight symptoms may have been left over. Otherwise serious nervous excitement, finally depressed conditions and even psychoses set in.

Masturbation is a frequent cause, and we must then insist upon a mode of life which absorbs all the energy of the patient, together with prohibition of everything which excites the senses (reading, balls, theatres, etc.). Other causes are fissures which are due to a resisting hymen, and impotence on the part of the husband (see § 5).

A nutritive disturbance of old age, viz., kolpitis vetularum, gives rise to adhesions, cicatrices, and bridges of tissue as the result of the formation of irregular patches which are due to small-celled infiltration (kolpitis ulcerosa adhæsiva).

The vascular anomalies of the vulva include phlebectasiæ (Plate 2) and varicocele parovarialis. The latter may give rise to intraperitoneal hæmatocele or hæmatoma of the broad ligament.

For the uterine symptom complex of dysmenorrhœa see § 4.

The hysterical symptom complex (see § 11 under Symptoms and § 17 under Diagnosis) represents an affection of the entire nervous system which, on ac-

14

count of the existence of a predisposition, develops as the result of great sensual or emotional excitement (which is borne by healthy individuals without injury) or of protracted dissatisfaction. City life, with its early predominance of mental activity and its numerous sensory impressions, the enervating comforts and luxuries, the absence of quiet work to strengthen the body, and of simple, well-defined duties with corresponding strengthening of the will—these factors, perhaps in combination with hereditary taint, furnish the general predisposition. In accordance with these views the treatment must prohibit these injurious influences in youth, and compensate for them at a later period.

The factors which may excite hysteria also include diseases of the genitalia, but they are not the sole cause. These diseases include puerperal processes with their sequelæ, which are partly irritating, partly exhausting on account of loss of blood; then the constantly painful oöphoritides, salpingitides, adhesions of pelvic peritonitis, inflammations of the uterus, intramural myomata, polypi which pass through the os, etc.

Symptoms.—Low spirits, sensitiveness, and feebleness of will are prominent.

Spasms and contractures, usually clonic, occasionally tonic, with retained consciousness and reflex irritability (pupils) are observed. Epileptiform attacks in the limbs and trunk (Charcot's arch) with accelerated respiration, and, according to the mood, shouting, crying, or laughing spells are characteristic. Spasm of the laryngeal and œsophageal muscles; spasm of the glottis (barking cough), spasm of deglu-

tition (globus hystericus), and singultus, are other
symptoms.

Paralyses of the limbs on one or both sides, of the
vocal cords, hysterical hoarseness and aphonia (case
in Heidelberg Clinic due to retroflexion of the uterus)
are among the paralytic phenomena.

General and circumscribed hyperæsthesiæ and an-
æsthesiæ, including clavus hystericus, spinal irrita-
tion, ovarie (Charcot), excessive or diminished special-
sense impressions dominate the sensory field.

The vasomotor and trophic nervous system is
affected, as shown by palpitation of the heart, ste-
nocardia, nervous dyspepsia, meteorism, secretory
anomalies of the skin (perspiration), kidneys (poly-
uria, ischuria), etc.

Diagnosis.—This is based on the rapid changes in
the symptoms and on the fact that they exhibit no
harmonious picture due to pathological changes in
any definite organ.

Treatment.—The prophylaxis corresponds to the
statements made above (see also the treatment of va-
ginismus in this section).

Psychical influence and education are all impor-
tant. Never express to the patient a sceptical opinion
concerning her ailment but furnish the proofs of its
general nervous character and then change the mode
of life, diet, etc.; regulate the various functions (see
§ 4) and treat any genital affection which may be
present.

Symptomatic Treatment.—Give potassium bromide,
monobromated camphor, extract of cannabis indica,
against irritative and excited conditions, also for pal-
pitation of the heart. Chloroform, morphine, atro-

pine, extract of cannabis indica (by the mouth, rectum, or hypodermically, according to circumstances) are administered as antineuralgics, sedatives, or narcotics.

Paralyses are treated by faradization or massage.

Spasms and convulsions by cold water in its various hydropathic forms.

Charcot's ovarie is mentioned in § 17 under Diagnosis.

Coccygodynia is a local hyperæsthesia of the coccygeal plexus. The treatment consists of extirpation of the os coccyx.

PART IV.

Injuries and Their Sequelæ.

CHAPTER I.

DEFECTS WITH CICATRICIAL CHANGES.

The large majority of all kinds of genital lesions develop during parturition. Its action varies according to location. Cicatricial healing in the vulva rarely gives rise to atresia; on the contrary, it produces gaping of the parts. The same process may be observed at the os uteri, *i.e.*, cicatricial healing of lacerations of the os, with ectropion. But here, as in the vagina and cervix, stenoses and atresiæ are much more apt to occur.

§ 24. INJURIES TO THE VULVA (INCLUDING FISSURES) AND DEFECTS OF THE PERINEUM; INCONTINENTIA VULVÆ.

Definition.—The solutions of continuity to be considered here bear the character of incised wounds, tears, and contused tears. According to the depth of the lesion they produce various effects, so that this furnishes a natural classification.

1. Fissures. These are slight solutions of continuity of the surface, for example, of the frænum. At

the hymen, neck of the bladder, and urethra (see §§ 22 and 23), fissures produce specific results.

2. Perineal ruptures of the first degree include tearing of the frenulum perinæi and the vestibulary perineal mucous membrane.

3. In perineal ruptures of the second degree the rent extends to the sphincter ani.

4. Perineal central ruptures: in this class the rents pass in the shape of a canal, from the vagina through the perineum, perhaps into the anus, while the anterior part of the frenulum remains intact (see Fig. 40 in the text).

5. Perineal ruptures of the third degree or complete ruptures consist of total rupture of the perineum into the rectum.

While all these ruptures occur almost exclusively or, at all events, very often from sexual processes (cohabitation, parturition, the puerperal state), there may also be violent injuries to every part of the vulva. On account of the abundance of blood-vessels these are attended by considerable danger, especially during pregnancy. The region of the clitoris is the most exposed and at the same time the most dangerous (see "Atlas of Obstetrics," § 60) for such wounds, which are usually due to falling astride. There have been cases of rapidly fatal hemorrhage from the corpus cavernosum. Such hemorrhages and injuries must be relieved at once by means of sutures.

Injuries of the nymphæ (ruptures and perforations) are unattended by further sequelæ.

Symptoms and Sequelæ of Perineal Ruptures.—If the ruptures are not sutured immediately after delivery and do not heal by first intention, cicatricial forma-

tion of integument will take place, with decided separation and distortion of the lower parts of the labia, in varying manner according to the degree of rupture.

Fissures cause simple burning and may give rise to infectious ulceration (see § 15 under "Puerperal Fever"). They are also apt to form upon the cicatrized surface of the perineum in the shape of rhagades (after coitus, difficult defecation).

In ruptures of the perineum of the first degree (Plate 64, Fig. 3) the tuberculum vaginæ is deprived of its support and covering by the frenulum perinæi. This part of the anterior vaginal wall sinks and the urethral meatus gapes.* This causes a predisposition to urethritis and vesical catarrh.

In ruptures of the perineum of the second degree a ridge of the posterior vaginal wall slides down over the cicatrix (see Plate 4, Fig. 1), and now begin all those prolapse processes which are described in §§ 7 and 8. In addition, vaginal and uterine catarrhs, cystocele and rectocele with their sequelæ are produced.

In ruptures of the perineum of the third degree (Plates 25, Fig. 1; 26, Fig. 2; 64, Figs. 2 and 4) there is incontinence of fæces, because the voluntary external sphincter (in extreme ruptures also the internal sphincter) is torn.

As is shown by the profile of the normal perineum in Plate 64, Fig. 1, the external sphincter, on sagittal section, forms a round structure in the anal depression, while the internal sphincter passes up at a right

* In Heidelberg I saw a case of this kind in a farmer's wife in which the result was that the husband had directed the impetus coëundi against the lowered tuberculum vaginæ and in this way had dilated the urethra to the size of a finger (as in Plate 61, Fig. 2).

angle as an elongated mass of fibres. In Figs. 2 and
4 both sphincters are wanting; in Fig. 3 both are in-
tact. But the entire perineum may be wanting, al-
though a part of the external sphincter is still retained.

There are also cases in which solid and even fluid
stools can be controlled voluntarily. This occurs
either when the external sphincter is still intact in
part, or when the lower part of the rectum is retracted
cicatricially. In the former event the rupture extends
less than $1\frac{1}{2}$ cm. high into the rectum. These cases
are not diagnosed easily because the rectal cicatrices
may acquire a pigmented epidermal layer.

These cicatrices may be the site of neuralgias or
pruritus; if fissures develop, burning will be pro-
duced. Some patients are annoyed by the moist feel
of the prolapsed vaginal walls, with or without inter-
trigo or fluor. There is also a distressing sensation
as if the viscera are about to fall out. The imperfect
closure of the vulva, which increases with the atrophy
of the adipose tissue in old age, permits the entrance
of air into the vagina. On contraction of the abdom-
inal muscles the air escapes in an audible manner
(garrulitas vulvæ).

Treatment.—These symptoms are relieved by plas-
tic operations, which have already been mentioned in
§ 8. Success depends partly on the preliminary pro-
cedures, viz., disinfecting, scrubbing, and irrigation of
the vagina and cervix, evacuation of the bladder and
especially of the rectum (even two to three days be-
fore the operation), narcosis; a cotton tampon must
be placed in the rectum.

The operation may be performed soon after child-
bed. Not alone must the cutaneous bridge between

the lower ends of the labia be restored, but the new septum with its anterior frænum edge must cover the tuberculum vaginæ, *i.e.*, support the anterior vaginal wall.

Furthermore, the new septum must represent a layer of tissue of a thickness corresponding to Fig. 1 in Plate 64 (triangular on sagittal section) so that a new fossa navicularis is formed behind it. Such a thick, fleshy layer is secured by making the incision and the first sutures as oblique as possible, but passing deep into the vagina; the sutures must be carried deeply through the vaginal wall as far as the rectal mucous membrane. These vaginal sutures, when passed through the thick, resisting tissues, support the entire plastic wound, so that the sutures which are to be applied from the perineum no longer undergo much strain and may be inserted less deeply.

The wound is freshened in various ways, according to the character of the rupture. If the vagina is involved high up, it receives the shape of a "hat," according to the Hildebrandt-Freund operation. If the main lesion of the vulva lies to the side, it is shaped like a "butterfly's wings" (Simon, Hegar).

The latter operators endeavor, by the denudation, to restore the physiological shape of the perineum as much as possible. Fritsch has followed their method. He keeps as close as possible to the cicatrices which run on both sides, in the vagina and outside, excises them, and inserts the sutures toward the vagina, perineum, and rectum.

Hildebrandt, Freund, and Martin cut one, two, or more tips out of the vagina, *i.e.*, they spare the posterior columna rugarum.

Bischoff, Winckel, and Küstner make a median vaginal or two lateral vulvar flaps to correspond to the shape of the cicatrices, *i.e.*, a flap`perineorrhaphy.

The term flap perineorrhaphy has also been applied falsely to the fourth group of perineoplasties of Simpson, Tait, Sänger, Zweifel, and v. Winckel. This is an extremely conservative method, *i.e.*, a plastic operation without removal of tissue. Corresponding to the former border of the perineum a curved transverse incision is made, and then drawn upward and downward by inserting hooks; the originally transverse but now chiefly vertical wound is then closed by vertical rows of sutures (one deep and one superficial). The tissues are therefore drawn from both sides.

The complete perineal ruptures (third degree) are operated according to the same principles, except that the rectal rent must be denuded and sutured separately.

In the after-treatment it is best to leave the wound uncovered; the most scrupulous cleanliness must be secured and the parts frequently washed. The legs are bound together by a towel. The sutures are allowed to remain *in situ* as long as possible (ten to twenty days), so that wire and silkworm gut furnish the best material.

On the third day a movement from the bowels is secured by the administration of castor oil in capsules. Its action can be aided by a high enema. If any sutures tear out, they should be removed separately. If a recto-vaginal fistula forms, the entire septum is divided and again united, but granulations must be avoided as surfaces of contact. The patient may leave the bed in two to three weeks.

§ 25. Vaginal and Cervical Lacerations.

(a) Simple injuries to the vagina, *i.e.*, without opening into the adjacent organs, occur most frequently during parturition. In other cases they develop as the result of unskilled and rough manipulations (forced coitus, rape, unskilled operative interference, and rough introduction of the hand, introduction of excessively large specula, attempts at abortion, cauterization, etc.), or accidental injuries analogous to the causes of vulvar lesions.

Symptoms.—The wound often heals by first intention; occasionally there are severe hemorrhages or septic infection. Upon this depends the treatment which includes disinfection, removal of necrotic shreds, ligature of vessels, union of recent wounds, tamponing with alum and iron chloride or iodoform gauze. Old stenotic or atresic vaginal cicatrices are partly excised, partly stretched (by the hand and by tampons). This may require long-continued treatment and, if pregnancy has already occurred, may necessitate complicated obstetrical manipulations (see "Atlas of Obstetrics," § 39).

(b) Lacerations of the cervix lead to commissural or stellate defects (Plate 10) or to laceration cicatrices of the os, and secondarily to ectropion (§ 13 and Plate 12). If they extend into the fornix and the para-cervico-vaginal connective tissue, they induce torsions and fixed displacements of the cervix (see § 11 and Plate 13).

Instead of simple lacerations which are converted into cicatrices, they may continue for a long time as grayish-yellow, red-rimmed fissured ulcers. Both

processes occur most frequently at the commissures
of the ostia, because these parts heal with greater
difficulty. The ulcers are followed directly (often
during child-bed, see § 15) by endometritis, metritis,
and parametritis, and secondary ectropion. The cica-
trices are followed directly by ectropion and then
by secondary uterine catarrh.

The cicatricial torsions may give rise to nervous
reflexes, similar to the epileptic and epileptiform at-
tacks observed as the result of other cicatrices; and
also to pains which radiate into the lower limbs.

Treatment.—Emmet first called attention to these
fissured ulcers and their sequelæ and proposed the
following procedure for their relief: From the lips
of the cervix, which are fixed and everted by means
of tenacula, the commissural cicatrices are drawn into
the vaginal fornix (but not too far on account of the
large vessels), then excised, and the adapted raw sur-
faces of the lips of the os are united. Martin-
Skutsch's modification is described on page 127;
excision of the proliferated mucous membrane is de-
scribed in § 14. Sänger devised a hysterotrachelor-
rhaphy. In this way the os resumes its normal shape
and size.

§ 26. TRAUMATIC STENOSES AND ATRESIÆ OF THE VULVA, VAGINA, AND UTERUS.

Congenital stenoses and atresiæ have been described
on pages 72, 74, 86, and 87.

Anatomy and Etiology.—Stenoses or even adhesions
may result from chronic inflammatory processes,
large retracting ulcers, excessive cauterization, and
acute infectious diseases.

The labia, which are made raw by inflammation, adhere to one another, occasionally even the meatus of the urethra. This results in stasis of the secretions and blood in the entire genital canal.

In the vagina complete adhesions occur mainly from cauterization and in old age.

Adhesions of the external os are the most frequent. This shrinks into a small, round, cicatricial opening, or is converted into two small openings by a bridge of integument, or is retracted by cicatrices into a funnel or wall of mucous membrane. The stenosis may be short and circumscribed or long and tubular and may give rise finally to membranous or band-shaped atresia. Atresiæ of the internal os are rarer, and still rarer atresiæ of the ostium tubæ. For the anatomical changes see § 1.

Symptoms and Diagnosis.—In stenosis we find the symptoms (described in § 3) of dysmenorrhœa and sterility with primary or secondary inflammation. Among symptoms of stasis we find only tension and vomiting or colic.

In atresiæ more severe symptoms occur only at the age of puberty (see § 1, Nos. 6–8). Examination with the speculum and sound is required; in hæmatometra, hydrometra, pyometra, lochiometra, bimanual exploration of the tense, elastic tumor in the place of the uterus will reveal the condition. After a while perimetritic symptoms set in.

Treatment.—The operations (mentioned in § 3) of forced dilatation and division of the commissures of the os are supplemented by v. Winckel's modification which is employed in thickening of the portio. If the portio is thickened and elongated, it is removed

under an elastic ligature (§ 8). If it is only thickened and the os narrowed, Sims' operation (described on page 87) is performed, and then small wedges are cut from the four raw surfaces which have been produced in each anterior and posterior lip by the commissural incisions. The wedge-shaped defects are then sutured as in Sims' operation.

Acquired atresia with hæmatometra is much more dangerous in regard to septicæmia than is the congenital form. The incision to give vent to the blood must be made so much more freely and rapidly and, after careful irrigation with a two-per-cent solution of carbolic acid, must be kept open with iodoform gauze.

Hæmatosalpinx and hæmatometra in uterus bicornis are removed by kœliotomy.

Acquired atresia vulvæ is relieved by separating the adhesions and inserting an iodoform gauze tampon. If necessary the raw surfaces are sutured separately.

CHAPTER II.

FISTULÆ.

Fistulæ develop most frequently as traumata during parturition. They are either complete at once, or they appear secondarily a few days after labor as the result of the falling out of a necrotic plug. Other fistulæ are due to pessaries (especially Zwanck's), operations, foreign bodies, other injuries, or perforating ulcerative morbid processes (malignant tumors; diphtheritic, puerperal, syphilitic ulcers; calculi in the bladder; perforating perimetritic

or parametritic abscesses; hæmatocele or extra-uterine pregnancies).

Several fistulæ may be present at the same time (see Figs. 33, 35, and 41–44 in the text).

§ 27. CLASSIFICATION OF FISTULÆ.

A. *Fistulæ of the Urinary Organs.*

Anatomy.—According to the parts into which the two openings of a fistula empty, we make the following classification:

FIG. 30.—Urethro-vaginal Fistula. FIG. 31.—Superficial Vesico-vaginal Fistula.

1. *Urethro-vaginal fistula* (Fig. 30, text): opens below the tuberculum vaginæ.

2. *Vesico-vaginal fistula* (Fig. 31, text): the most frequent; every part of the anterior wall of the bladder as high up as the vertex may be affected. The opening is observed with the greatest frequency near the fornix vaginæ; if the fistula extends to the outer rim of the os, it is called—

3. Superficial *vesico-vagino-uterine fistula* (Fig. 32, text). Special importance attaches to it because its cicatricial traction on the lips of the os and thus upon the cervical canal exerts a marked influence.

If the os is also ruptured, it results in the—

4. Deep *vesico-vagino-uterine fistula* with destruction of the anterior lip of the os (Fig. 33, text).   The

FIG. 32.—Vesico-fornix Fistula.

FIG. 33.—Deep Vesico-cervico-vaginal Fistula, with Defect of the Anterior Lip of the Os.

last two varieties are situated in the middle, and are small because they are due to contusion at the symphysis in a contracted pelvis.

5. *Vesico-cervical fistula* (Fig. 34, text).   This forms narrow canals which, on account of the peculiar anatomical relations of the cervix, portio, and fornix may be combined with vesico-vaginal fistula, inasmuch as

FIG. 34.—Vesico-cervical Fistula.

FIG. 35. — Vesico-cervico-vaginal Fistula with Kolpokleisis.

the same vesical initial canal may bifurcate or divide entirely (Fig. 35, text).

On the other hand, the point of rupture may lie to

one side and involve the opening of the ureter into the bladder. If the other opening is situated in the vaginal wall, this gives rise to the—

6. *Vesico-uretero-vaginal fistula* (Fig. 36, text). Cor-

Fig. 36.—Vesico-uretero-vaginal Fistula.
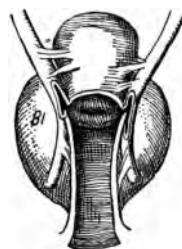
Fig. 37.—Uretero-vaginal Fistulæ on Both Sides (inflammatory adhesions).
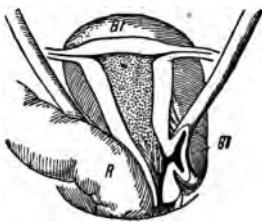
Fig. 38.—Uretero-cervical Fistula of the Right Side. *R*, rectum; *Bl*, bladder.
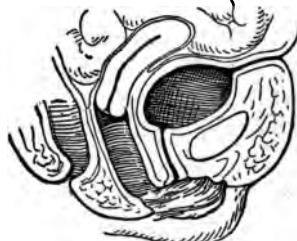
Fig. 39.—Vesico-abdominal Fistula (persistent urachus).

responding to the course of the ureters, it is situated laterally or posteriorly in the fornix.

Pure ureteral fistulæ develop when the injuries are situated higher; even then they may pass to the fornix as a—

7. *Uretero-vaginal fistula* (Fig. 37, text). As in all fistulæ of the ureters the opening is found with diffi-

15

culty on account of its small size. It is to be looked for as in 6; like the urethra it often empties at a reddened prominence.

8. *Uretero-cervical fistula* (Fig. 38, text). In addition there are also uretero-intestinal and urete-

FIG. 40. — Perineum. Central rupture.

FIG. 41. — Ileo-vaginal Fistula; Recto-vestibular Fistula.

FIG. 42. — Anus Præternaturalis Ileo-vaginalis; Recto-vaginal Fistula.

FIG. 43. — Vesico-uretero-rectal Fistula. Uterus displaced to the left. *R*, rectum.

ro-abdominal fistulæ. A fistula of specific origin is the—

9. *Vesico-abdominal fistula* (Fig. 39, text). This includes various degrees and localizations of the defect. It occurs very rarely and is usually congenital, rarely the result of perforation of an inflammatory adherent bladder.

The term fissure is applied to:

(a) *Fissura vesicæ inferior,* a fissure underneath the closed symphysis, often combined with clitoris fissa;

(b) *Fissura vesicæ superior,* a fissure above the normal symphysis. A true fistulous canal is—

(c) *Fistula vesico-umbilicalis, i.e.,* the persistent urachus.

T h e extreme congenital defects are:

(d) *Vesical fissures, i . e . ,* eversio (exstrophia, ectopia) vesicæ with or without symphysis fissa (see § 1).

FIG. 44. — Ileo-uretero-vesical Fistula. *D,* ileum in the vesico-uterine fossa.

10. *Ileo-vesical fistula* or ileo-uretero-vesical f i s t u l a (Fig. 44, text). Of the traumatic and ulcerative, perforating communications between the bladder and intestines, that involving the small intestine is the more frequent. There are also vesico-gastric fistulæ.

11. *Recto-vesical fistula* or recto-uretero-vesical fistula (Fig. 43, text) is due to perforating pelvic abscesses.

B. Intestinal Fistulæ.

1. *Recto-vaginal fistula* (Fig. 42, text), or recto-vestibular fistula (when outside of the hymen) (Fig. 41, text).

2. *Ileo-vaginal fistula* (Fig. 41, text). An opening in the small intestine leads usually into the fornix, so that the larger part of the fæces pass along the intestines. When the upper extremity of the point of rupture in the intestines empties entirely into the

vagina, complete defecation will take place through the vagina; this communication is known as—

3. *Anus prӕternaturalis ileo-vaginalis* (Fig. 42, text). Both forms occur very rarely and equally in the anterior and posterior peritoneal pockets.

The size and shape of the fistulæ vary greatly. As a general thing they are larger when recent, and later they undergo cicatricial retraction. They are either canalicular or fissured. Vesico-vaginal and recto-vaginal fistulæ are the largest. The length varies according to the mode of origin. For example, they may be very long and multiple when an abscess ruptures into both viscera. The cicatricial tissue around the fistula is so much more extensive the more the tissues have been necrosed by compression and have been gradually exfoliated. Smoothly cut fistulæ are surrounded by much healthier tissue. At the onset every fistula secretes wound fluid and forms granulations.

The associated injuries may be so extensive that the uterus cannot be found in the cicatricial masses.

If the urine is discharged constantly along the new passage, the parts which no longer conduct the urine undergo retraction, and the ureters or urethra may even be obliterated. In the larger vesico-vaginal fistulæ the wall of the bladder is invaginated into the lumen of the vagina, so that catarrhal inflammations and polypoid proliferations are apt to develop, and may result in serious inflammations of the kidneys. Pericystic irritations and adhesions are further sequelæ.

The genital mucous membranes, including the vulva, undergo inflammation and incrustation on account of the constant contact with the urine (which gradually undergoes decomposition).

Proctitides develop in a similar manner. In ulcerative perforations a descent takes place from the organ first ulcerated, so that the fistula runs an oblique course from the large primary opening (Fig. 42, text).

Symptoms.—Involuntary micturition is a prominent sign. This symptom varies according to the character of the fistula and according as the patient is standing or lying or according as she retains the urine in the vagina on account of swelling of the vulva. The discharge does not occur immediately after the injury, but, in compression necrosis, only after the lapse of several days, when the plug has been exfoliated.

1. In urethro-vaginal fistulæ the sphincter, and hence voluntary closure, may be intact, but the direction of the stream of urine has been changed.

2. In vesico-vaginal fistulæ (with a large opening, which is not narrowed by cicatricial membranes or by calculi with a valvular action) there is a constant discharge of urine.

3. In vesico-fornix and vesico-uterine fistulæ the patient can retain the urine while standing, so long as the lower part of the bladder fills up. In the recumbent position it flows at once into the vagina. Moreover, in standing, the uterus acts either as a lever or valve, inasmuch as the falling forward of the corpus in part causes displacement of the walls with the opening of the fistula and in part occludes it with the portio (in vesico-uretero-uterine or vesico-vaginal fistulæ).

4. In ureteral fistulæ voluntary evacuation occurs because very little urine can escape through the fine

fistulous canals, or, if the lesion is unilateral, it will be derived only from the corresponding kidney.

5. In the smaller recto-vaginal fistulæ only flatus and diarrhœal stools escape involuntarily; in large ones firm fæces also escape. The amount voided involuntarily gradually diminishes as the result of cicatricial retraction.

The urine, which soils all the parts, gives rise to a penetrating odor, to catarrh of the genitals, rawness of the external parts, and colds. Disorders of sleep and appetite develop, the patient must remain isolated, becomes unable to work, is a burden to those around her, and in this way a melancholic mood is produced. The same remarks hold good concerning intestinal fistulæ. After the lapse of many years the patient succumbs to this failure of the general nutrition.

Diagnosis.—The fistulæ located in the anterior wall of the vagina are recognized most easily, by simple digital exploration, if the fistula is as large as the tip of a finger. A sound or catheter should be passed through from the bladder.

In small fistulæ and those which empty on one side or into the cervical canal, a colored fluid is injected into the bladder (milk, solution of permanganate of potassium) and the parts are then carefully observed in the speculum. The opening is then fixed with hooks and the course of the canal ascertained by the aid of fine sounds. In vesico-uterine fistulæ the os must be everted or, if necessary, dilated or cut; in like manner, stenoses must first be relieved.

If urine but no colored fluid escapes through the genitalia, we have to deal with ureteral fistulæ. The

uretero-uterine fistula is differentiated from the uretero-vaginal fistula by firmly tamponing the os; in the former variety the vagina will then remain dry.

If we still remain in doubt, dilatation is performed by means of Simon's urethral specula and the interior of the bladder is palpated. This procedure also enables us to arrive at a conclusion when other vesical fistulæ (ileo-vesical, etc.) are suspected. As a final diagnostic measure Trendelenburg makes the high operation for cystotomy.

In intestinal fistulæ the diagnosis depends on the character of the ingesta or fæces.

Treatment.—According to the modern progressive technique, surgical closure of urinary fistulæ is the natural method. Still more than in kolporrhaphy and perineoplastic operations, everything depends upon the most minute exactness.

1. In laying bare the field of operation free use must be made of Simon's posterior and anterior blades, retractors, fine single and double tenacula, or Muzeux's fine claw forceps. Formerly the principal cause of the frequent failure in the operation lay in the difficulty of access to the fistula. If the vagina is stenosed, it must first be dilated mechanically or by incisions.

The patient lies in the breech-dorsal position, with the legs drawn up at right angles to the trunk.

In order to operate deep within the narrow cavity we employ Simon's long-handled fistula knives, both straight and bent at an angle. The edges of the fistula are grasped with fine tenacula. If the anterior wall of the bladder projects into the canal it is held back by a large catheter.

2. An important point is the proper selection of the method of denudation, in order to secure the most natural and easy adaptation of the edges of the fistula; an invaginated wall of the bladder should be denuded and stitched in, while the infolded vaginal wall should be replaced in the vagina. Cicatricial tissue is excised. It is preferable to leave the vesical mucous membrane intact, because the sutures are apt to become incrusted with urinary salts and then to give rise to urinary calculi or to new, fine fistulous canals. If simple paring does not suffice, T-shaped or Y-shaped flaps must be formed.

3. The sutures should not be drawn too tightly and should not be too close to one another (0.75 cm.). The suture must always be passed through the entire depth of the wall of the fistula, first on one side, then on the opposite side, and then the two walls drawn together. Any spirting vessels must be included in the sutures. Sutures of silk or silkworm gut, and Simon's or Hagedorn's fistula needles are used.

If the urethra is stenosed, it must be dilated forcibly.

Cervical fistulæ are operated after division of the lips of the meatus. Ureteral fistulæ are closed plastically by means of oval flaps, which are stitched over a catheter introduced into the ureter (after an artifical vesico-vaginal fistula has been established [kolpocystotomy] in order to permit the introduction of the catheter into the ureter).

If these operations fail, we must resort to transverse obliteration of the vagina (kolpokleisis of Simon)—*i.e.*, the production of a urinary reservoir in the upper part of the vagina which opens into the

bladder—or to hysterokleisis, *i.e.*, the paring and suturing of the lips of the os. In an almost analogous manner vesico-vagino-uterine fistulæ may be closed by stitching in the anterior or posterior lip of the os. The resulting condition is not a very desirable one, on account of the development of incrustations, catarrhs, etc., and in some cases it again becomes necessary to remove the obliteration. In one case of this kind v. Winckel finally succeeded in securing permanent recovery of the fistula.

After-Treatment.—The bladder must be irrigated immediately after the operation with an antiseptic (if necessary, impermeability must be demonstrated by means of milk or permanganate of potassium). Subsequently catheterization need be performed only when the patient cannot void the urine voluntarily. The patient rests in bed for a few days; silk sutures are removed at the end of five days, silkworm gut at the end of eight days. Vaginal irrigations are made only when the discharge is fetid. After-operations are performed at the end of a month.

Vagino-rectal fistulæ, in the majority of cases, are also treated by operation. After cutting around the opening in an oval shape or making a vaginal flap, the sutures are inserted in a manner similar to that employed in urinary fistulæ. Very fine fistulæ, or those attended with anal defect or those left over after perineoplastic operations, are closed by dividing the entire recto-vaginal septum. Laxatives are previously administered for several days and both organs thoroughly irrigated with antiseptics. During the

operation the upper edge of the fistula is pulled down with hooks, and the rectum closed with a tampon of cotton above the fistula. After the operation, fluid diet and mild cathartics are indicated.

Ileo-vaginal fistulæ are treated in the following way: By means of a clamp forceps the septum of both ends of the small intestine is made to undergo necrosis, and it is thus made possible that, after plastic membranous closure of the vagino-intestinal opening, the ingesta may again pass conveniently along the reclosed loop of intestine.

Cauterizations with fuming nitric or sulphuric acid, chloride of zinc, Vienna caustic paste, caustic potash, nitrate of silver, the actual cautery, are unreliable, usually act very slowly, and exert an unfavorable influence on any operations which may become necessary at a later period (on account of the production of rigid, anæmic edges of the fistula). Hence they are only suitable in long, fine fistulæ with vigorous granulations, not when the edges are hard and callous. If necessary, they may be combined with Fritsch's catheter à *demeure* (see § 22).

CHAPTER III.

TRAUMATIC HEMORRHAGES.

Traumatic hemorrhage may occur into the connective tissue surrounding the genitalia (hæmatoma) or into the abdominal cavity (hæmatocele intraperitonealis).

§ 28. HÆMATOMA: (*a*) VULVÆ, (*b*) RETROUTERINUM, PERIUTERINUM, OR ANTEUTERINUM EXTRAPERITONEALE.

(Hæmotocele Extraperitonealis.)

(*a*) *Hæmatoma vulvæ* (see Plate 2, Fig. 1) is a suddenly developed, tense, elastic, fluctuating, bluish, translucent tumor in the labia, which is attended by pain and itching.

Treatment.—An ice-bag and compression are used. If the skin is necrotic, an incision is made and an iodoform gauze tampon applied.   Recovery is slow.

(*b*) *Hæmatoma retrouterinum, periuterinum, and anteuterinum extraperitoneale* (see Plate 42, Fig. 3) occurs especially in the broad ligament and may pass alongside the vagina to the floor of the pelvis.   After an injury (fall), sudden collapse from anæmia is observed, with violent pain in the pelvis; there are also disturbances of micturition and defecation.   Fever and peritoneal irritation are absent, unless the broad ligament ruptures and an intraperitoneal hæmatocele of Douglas' cul-de-sac develops.

In the former event Douglas' sac is found empty on bimanual exploration, while the posterior fornix is depressed and a tense, elastic tumor is felt at the side of the uterus.

Treatment.—This consists of rest, horizontal decubitus with the head lowered, the use of stimulants, and, if necessary, a resort to incision.

§ 29. HÆMATOCELE RETROUTERINA INTRAPERITONEALIS.

In regard to definition and etiology see the explanation of Plate 42, Fig. 2.

Symptoms.—Sudden anæmia, collapse, and pain are observed as the result of peritoneal irritation. If no infectious germs pass from the blood, through the tubes, or from the parametria into the extravasated blood, absorption will run an apyrexial course. Otherwise there are violent peritonitic pains and fever.

Protracted discharge of blood (not fresh) takes place from the uterus (according to v. Winckel this passes from the extravasated masses of blood through the tube into the uterus).

Pressure on the adjacent organs causes neuralgias and dysmenorrhœa, constipation, and interference with micturition.

Further hemorrhages—which are especially apt to occur after previous attacks of perimetritis—cause repeated sudden exacerbations, until finally absorption takes place or, rarely, perforation into a hollow viscus (usually the rectum) with the danger of gangrene. A callosity is left over after absorption.

Diagnosis.—Bimanual exploration must be made with the greatest care in order that further hemorrhages may not occur, that the tumor, which becomes encapsulated in fibrin, may not rupture into the free peritoneal cavity, and that germs should not be squeezed out of the tube. Moreover, palpation of the posterior fornix is very painful. All manipulations which involve the use of the sound or of incisions, must also be avoided.

The uterus is anteverted; the posterior fornix of the vagina is pushed downward by a tense, elastic tumor. Douglas' sac is rounded out by the tumor in such a way that the contours of the latter pass un-

interruptedly into the border of the fundus uteri. Hence it is sometimes mistaken for retroflexion of the gravid uterus, especially if the latter is associated with perimetritis. Further diagnostic data are furnished by the previous history and the above-mentioned symptoms. The fact that the tumor runs an apyrexial course and grows smaller and nodular favors the diagnosis of hæmatocele.

Treatment.—Absolute rest in bed and avoidance of all therapeutic internal examinations and manipulations are indicated. In addition, we may use an ice-bag and opium, morphine, or chloral per enema (in order to depress the action of the heart). Kœliotomy must be performed if the collapse continues and there is reason to suspect an extra-uterine pregnancy (see "Atlas of Obstetrics," §§ 44-46).

If perforation threatens or there are violent pains and febrile attacks and the size of the tumor remains unchanged, an incision is made from the vagina into the most prominent part, the sac is drained and irrigated daily under slight pressure; an ice-bag, mild diet, enemata, mild laxatives are then indicated, otherwise kœliotomy is performed. In perforation into the rectum no examination should be made on account of the danger of producing gangrene.

Absorption is furthered by the administration of absorbent remedies (see § 18). We must insist upon rest during subsequent menstruations, at which time new hemorrhages are apt to occur.

Prognosis.—The earlier the above treatment is adopted the more favorable is the outlook for complete absorption in a few weeks or months. In per-

fcrations the prognosis depends upon the use of anti-
sepsis.   Rupture into the rectum is the most favorable
form.

CHAPTER IV.

FOREIGN BODIES IN THE GENITAL CANAL AND BLADDER.

Foreign bodies in these parts may cause injury
from their mere entrance or they may give rise to
inflammatory symptoms after having been *in situ*
for some time.   The treatment of the first group is
carried out in the manner indicated in §§ 24, 25.

§ 30. FOREIGN BODIES

enter the bladder, vagina, or uterus as the result of
four different causes :

(*a*) Retention of therapeutic instruments and the
like; for example, pieces of vaginal tubes, glass spec-
ula, incrusted pessaries, needles, tampons, laminaria
tents, silk sutures, etc.

(*b*) Masturbation, perverse or criminal manipula-
tions, with hairpins, needle cases, candles, lead pen-
cils, pine cones, pomade boxes, spools; tampons,
sponges, and occluding pessaries (to prevent concep-
tion); knitting needles and other sharp instruments
(to produce abortion).

(*c*) A fall upon a sharp picket, etc.

(*d*) Bodies coming from within the individual her-
self, such as perforating tumors, dermoid cysts
(teeth, hair), extra-uterine fœtuses ("Atlas of Obstet-
rics," Fig. 115), echinococcus vesicles, fistulæ from

other viscera. This category also includes parts of the ovum which have been retained in the uterus, vesical calculi, incrusted catheters or broken pieces of a catheter.

The results, usually of an inflammatory, ulcerative, or fistulous character, have been described in §§ 22, 24, and 25, and in the explanation of Plate 60,

Treatment.—The removal of incrusted pessaries is mentioned in Plate 60.

Every extraction from the genital canal should be preceded by a disinfecting irrigation (partly on account of existing inflammation with fetid discharge, partly on account of the injuries to the mucosa which are apt to follow extraction).

The foreign body should be removed carefully with the finger. If this is unsuccessful, instruments are resorted to (bullet forceps, polypus forceps, tenacula), the mucous membrane being guarded carefully against sharp points. If this is also unsuccessful, the foreign body is either divided into pieces or incisions are made. In such cases profound anæsthesia must be produced.

In foreign bodies of the bladder the diagnosis is made with the metallic catheter, bimanual exploration, or after dilatation of the urethra (see § 22). The latter manipulation is also employed for extraction. The bullet forceps are passed alongside the exploring finger and applied to the foreign body, as far as possible at one end, in order to prevent the latter from assuming a transverse position; or the foreign body is brought within the lumen of a speculum. Distention of the bladder with a solution of boracic acid is sometimes useful. If the foreign body is too large

it is comminuted, otherwise kolpocystotomy is performed; in children, suprapubic section is indicated.

In relation to other foreign bodies, *vesical calculi* not alone assume a separate position so far as regards etiology, symptomatology, and treatment, but also in relation to the similar affection in man. This difference is manifested even in childhood. The shortness and comparative width of the female urethra permit the passage of calculi of the size of a cherry pit, so that concretions of urates more rarely grow into calculi.

Etiology and Symptoms.—All foreign bodies (including particles of mucus and pus in vesical catarrh, as well as tumors) become incrusted with deposits of urates, phosphates, oxalates, or cystin. The formation of calculi is also due to all vesical catarrhs and other factors which produce general or partial retention of urine (paralysis of the bladder, cystocele, diverticula). On the other hand, calculi cause vesical catarrh, so that the symptoms of the latter form part of the clinical history of calculous disease.

The stone irritates the bladder and causes hyperæmia, hypersecretion, hemorrhages, pains (local and radiating into the genitalia, loins, lower limbs), and spasm. The local friction leads to ulceration, perforating abscess, and the formation of a fistula.

The urine, accordingly, contains flocculi of mucus, pus, blood, and pavement epithelium.

Diagnosis.—The stone is readily felt by bimanual exploration, introduction of the catheter, and dilatation of the urethra (see § 22). Whether the calculus is in a cystocele or diverticulum is shown by dis-

placement with a catheter, after the bladder has been filled with a two-per-cent solution of borax.

Treatment.—(*a*) *Prophylactic* treatment must remove causes, such as vesical catarrh, cystocele, foreign bodies, fistulæ.

(*b*) *Radical* treatment or removal of the calculus:

1. Through the urethra after dilatation (see § 22).

2. By kolpocystotomy, *i.e.*, opening into the bladder from the vagina by means of a T-shaped incision, whose upper transverse arm is situated in the fornix, close to the anterior lip of the os. If this method is impracticable on account of the large size of the stone or the narrowness of the genitalia, we resort to—

3. High section (suprapubic cystotomy). After evacuation of the intestines 350 gm. of a two-percent solution of borax are thrown into the bladder in order to lift the peritoneum with the bladder above the symphysis. An incision 5–7 cm. long is made in the linea alba, beginning directly at the symphysis (or a corresponding transverse incision, Trendelenburg); 1–2 cm. of the fascia transversalis are divided immediately above the symphysis, the beak of the catheter (left in the bladder) is raised against the wound, and the bladder is opened upon the catheter.

16

PART V.

Neoplasms.

Etiology.—The causes of tumors of the female sexual organs are involved in obscurity, as are those of tumors in general. It is evident, however, that the structural equilibrium, *i.e.*, the physiological relation of the individual forms of tissue to one another, may easily be lost in organs which, on the one hand, are subject to such active and variable changes in form and structure, and, on the other hand, are exposed to so many mechanical and bacillary noxious influences and nervous irritative conditions.

Proliferations are observed in long, protracted inflammations in general (see Part III., Chapter I., and § 22) or in specific infectious inflammations (see §§ 12, 20, and 21). We are able to notice that such inflammatory proliferations gradually lose the physiological proportion of the epithelial to the connective-tissue structures or of the cellular to the fibrous elements, *i.e.*, they become atypical and assume a malignant character (see Endometritis fungosa and Erosio papilloides, § 13, also Plates 7 and 50). In like manner it is found that benign growths, for example, myxofibroma, assume a sarcomatous character. Pigment nævi of the vulva exhibit a decided tendency to undergo sudden conversion into the most malignant melanosarcoma. In such cases repeated cauteriza-

tion, enucleation, and consequent infections have undoubtedly often acted as the starting-point of the malignant metamorphosis. As in all epitheliomata, the menopause is the period of life which is attacked most frequently.

In view of the predilection of malignant epitheliomata for the vulva and cervix uteri, and the frequency of their occurrence in multiparæ, there is evidently a connection with the vulnerability of these parts, analogous to the predisposition to mammary cancer created by mastitis cicatrices. The cause may reside either in the cicatrices *per se*, or in the original or some other specific infection.

Concerning sarcomatous and malignant cystomatous tumors we possess no etiological data. Indeed, the former occur with relative frequency in childhood or as a congenital condition. In the case of dermoid cysts we appear to have to deal with a sort of "intra-fœtation."

Polypi of the mucous membranes are regarded, in the majority of cases, as circumscribed inflammatory proliferations (endometritis polyposa); but for the proliferations of the muscular coat of the uterus (myoma and fibromyoma) we are entirely lacking in etiological data. They occur much more frequently in women who have borne very few children or none at all. Perhaps the sterility (despite regular sexual intercourse), perhaps the causes of sterility give rise to myomatosis. There is often secondary proliferation of the mucosa, and this may be the cause of the sterility.

CHAPTER I.

BENIGN TUMORS.

The term benign tumors applies anatomically to those which retain the typical structure of the tissue from which they are derived, do not "eat up" the remaining tissues by the predominance of cell proliferation, or cause destruction by metastases in remote parts. Clinically, however, certain anatomically benign tumors may be attended with pernicious results to the organism. In this chapter we shall discuss only the absolutely benign tumors.

§ 31. BENIGN TUMORS OF THE MUCOUS MEMBRANES COVERED WITH PAVEMENT EPITHELIUM (CUTIS TUMORS OF THE BLADDER, VULVA, VAGINA, AND THE ORGANS CONTAINED THEREIN).

The mucous membrane covered with pavement epithelium lines the vagina, vestibule, bladder, and urethra, and, in the broad sense, the vulva. It consists of several layers of pavement epithelium resting upon cuboid matrix cells, the connective tissue of the cutis which forms papillary bodies of varying shape (see Plate 5 and "Atlas of Obstetrics," § 17), and the adipose cells. Embedded in these parts are lymphatic vessels and follicles—blood-vessels which form cavernous erectile tissues in the clitoris, nymphæ, and the parts around the urethra—sebaceous glands, the two glands of Bartholin (see Plate 4) which are lined with cylindrical epithelium, the glands and ducts of the urethra (Skene's glands, see Fig. 20) and the

bladder (the vagina rarely contains any glandulæ aberrantes), finally muscular fibres and nerves. The tumors under consideration may grow from any of these tissues. We distinguish accordingly:

1. Papilloma and condyloma, also lupus of the vulva (see §§ 12 and 20, Plates 3 and 6), and rarely of the vagina.

2. Condyloma (caruncle) of the urethra (see Plate 3, Fig. 1).

3. Papilloma of the bladder.

4. Fibroma, myxofibroma, fibromyoma of the vulva.

5. Fibroma, myxofibroma, fibromyoma of the vagina.

6. Mucous-membrane polypus or papillary polypoid angioma, fibroma, fibromyoma of the urethra.

7. Mucous-membrane polypus, fibroma, fibromyoma of the bladder.

8. Lipoma of the vulva, usually pedunculated, and of the vagina.

9. Elephantiasis lymphangiectatica of the vulva (see Plates 3 and 6).

10. Cysts of the vulva (glands of Bartholin; in the region of the clitoris and urethra; occluded sebaceous glands of the nymphæ) and of the vagina (this includes the kolpohyperplasia cystica which produces trimethylamin).

11. Cystoid myxoadenoma of the urethra.

12. Cysts of the vesical mucous membrane (in one case I found these in a fœtus, see v. Winckel's "Berichte und Studien," Munich).

Diagnosis and Treatment.—New formations of the vulva are usually polypoid, so that they are easily removed with scissors, the knife, galvano-cautery, or

Paquelin's cautery.   The latter is especially adapted
to broad-based or very vascular tumors.

Fibromyomata of the vagina are rare, but may
grow to such a size that they lift the uterus above the
entrance to the pelvis and interfere with the sexual
functions, as with those of the bladder and rectum.
If they have a broad base, they should be enucleated.
Sometimes they undergo myxomatous degeneration.
In all cases care must be taken to ascertain whether
we really have to deal with vaginal tumors.

Vaginal cysts vary in size and structure, according
to their origin.   They may contain ciliated epithe-
lium and serous fluid as the remains of a Gärtner's
duct or a fissured vagina (see Fig. 20, after my prep-
aration of a fœtus), or more or less blood-stained fluid
as the remains of an absorbed hæmatoma.   A wide
piece of the wall should be excised and the cavity
tamponed.

Tumors of the urethra are very sensitive and bleed
readily.   The pains, which are often combined with
itching, annoying sexual irritation, or vesical tenes-
mus, radiate into the surrounding parts and may ex-
cite spasmodic seizures.   Urination is painful and
interrupted.   If the tumors increase in size, they
project from the urethral meatus; otherwise they may
be drawn down with the aid of fine tenacula or the
urethra is incised or dilated.

The latter preliminaries must also be made for the
removal of the tumors.   The tumors are ligatured and
cut off, or removed with the Paquelin or the wire loop.

Papillomata of the bladder first give rise to an un-
defined pressure in the region of the bladder, and
then to early disorders of micturition (tenesmus, is-

churia). Then violent radiating pains make their
appearance. On account of the ease with which the
surface of the tumor is injured, there are frequent
hemorrhages and hence follows a very striking symp-
tom, viz., hæmaturia. On account of the production
of fibrin, this may lead to plugging of the urethra
during urination. Then decomposition of the urine
sets in and with it all the signs of vesical catarrh.
As particles of the neoplasm are detached, these may
also give rise to plugging of the urethra or the de-
posit of concretions, i.e., the production of calculi.

When such signs are present we should dilate the
urethra and palpate the interior of the bladder. Mi-
croscopical examination of particles of the tumor
should be made; if they are intact and not degene-
rated, this fact favors the diagnosis of a benign tu-
mor. We must think of the possibility of perforating
tumors, for example, dermoid cysts and extra-uterine
fœtal sacs.

After dilatation of the urethra the tumor is removed
by introducing the index finger of the left hand and
the wire écraseur with the right hand. If the tumor
has a broad base or is very large, it is incised or
compressed between the two hands. The hemor-
rhage is checked by application of liquor ferri sesqui-
chloridi, ferripyrin, the injection of ice water, appli-
cation of an ice-bag, and firm tamponing of the
vagina.

If this plan is impracticable, we must resort to
kolpocystotomy or suprapubic section (see § 30). As
regards prognosis, the removal of the tumors with the
technique of to-day is unattended with danger to life
or with permanent incontinence.

§ 32. BENIGN TUMORS OF THE UTERUS.

The only absolutely benign tumors, so far as regards the sequelæ and the removal of the tumors, are the mucous polypi (*i.e.*, the small, polypoid, circumscribed proliferations of the mucous membrane) and the stationary, subserous, small intramural and small

FIG. 45.—Polypus of the Mucous Membrane of the Fundus Uteri.

polypoid, submucous fibromyomata are narrow pedicles.

Among the forms of myoma which are doubtful and often dangerous are included the broadly proliferating polypi (molluscum) of the mucous membrane and the large and broad-based fibromyomata, especially if they are intramural and submucous.

The benign tumors accordingly include:

1. *Mucous* (*Membrane*) polypi (benign adenoma): (*a*) of the lips of the os, (*b*) of the mucous membrane of the cervix and corpus (see Plates 16, Fig. 1; 46, 59 for the anatomy and histology, and Fig. 45, text). These occur frequently, are usually multiple, and are often combined with myomata and situated upon them. They usually remain small in size.

Symptoms and Diagnosis.—Hemorrhages are very frequent. As an entire series of these adenomata is due to endometritias fungosa or decidualis (deciduoma of Küstner), with or without the production of cysts (the ovula Nabothi drag upon the mucous membrane, Plate 59), the symptoms of the latter condi-

tions are observed, especially the disorders of menstruation.

The adenomata of the lips of the os are adenomatous hypertrophies, while those of the higher parts of

Fig. 46.—Intramural Myomata. The muscle tumors of the uterus develop (according to v. Winckel) exclusively in the muscular part of the organ, especially the corpus. From here they grow out of the walls (see next figure). Cysts in the proliferated cervical mucosa.

Fig. 47.—Intramural Myomata, developing in the corpus, growing in various ways out of the walls: subserous, submucous, downward in the walls of the cervix. All have a broad base, and are surrounded by circular fibrous tissue with gaping vessels. Mucosa thickened.

the mucous membrane are pedunculated. Upon this fact is based the diagnosis with the speculum. They are dark red, usually soft, and bleed with remarkable facility. As they push down against the ostia, they

produce a corresponding feeling of pressure and give rise to reflex nausea. In many cases, however, these symptoms are entirely overlooked.

FIG. 48.—The tumors begin to be pedunculated as fibromyoma subserosum polyposum or submucosum polyposum. The myoma of the cervix, which has resulted from the sinking, begins to be enucleated from its bed (see "Atlas of Obstetrics," Fig. 96). Circular grouping of the fibres in the tumors.

Treatment.—Removal of the pedunculated, easily accessible tumors with the wire loop or, after constriction, with the scissors is indicated.

When the pedicle of the tumor is accessible with difficulty (Fig. 45, text), the ostia are dilated with well-sterilized laminaria tents or the commissures are incised, and the internal os is dilated with metallic dila-

tors; then the lips of the os are separated with hooks. If the hemorrhage is severe we apply the Paquelin cautery or liquor ferri sesquichloridi, and then make a firm tampon of iodoform gauze (one to two days).

Flat tumors are curetted (see § 13, *b*), then a tampon of iodoform gauze is inserted; cysts are punctured (Plate 59).

All these tumors must be carefully removed with the pedicle in order to prevent relapses. If there is a great tendency to relapse, repeated cauterization with zinc chloride or liquor ferri sesquichloridi is performed after the removal of the new growth.

2. *Fibromyomata with absolutely benign course;* these include the stationary intramural myomata (parietal), small fibromyomata submucosa or submucosa polyposa, small fibromyomata subserosa or subserosa polyposa (see Figs. 46-48, text, and Plates 16, Fig. 2; 22 and 25; 34; 35; 37, Fig. 2; 40; 44, Fig. 2; 46; "Atlas of Obstetrics," Fig. 96. For anatomy and physiology, see explanation of Plates 41 and 46).

Symptoms.—It is evident that these tumors may be regarded as "absolutely benign" only so long as they remain small, so that early diagnosis and removal or prophylactic treatment for the purpose of keeping them small is a matter of great importance.

Initial symptoms: All the symptoms are independent of the size of the tumor. A characteristic of small intramural tumors is the violent, boring pain, due to the tension. This pain is increased in all congestive conditions (menses, cohabitation, constipation) and in explorative examinations of the uterus, which may not be enlarged or displaced. The pains radiate into adjacent parts, give rise to reflex neural-

gias in the small of the back and loins, and constitute
a great part of the symptom complex when the gen-
eral condition of the patients is otherwise good from
an objective standpoint.

The next symptom, in point of time, is hemor-
rhage, at first in the shape of menorrhagia, later as
irregular metrorrhagia.

The cause is glandular endometritis over the
tumor; but as soon as the last muscular fibres have
disappeared between the neoplasm and the mucosa,
a fungous endometritis or multiple adenomatous new
formations (Wyder) develop in combination with the
proliferation of the interstitial tissue.

In accordance with their mode of development these
hemorrhages occur almost exclusively (and at an
early period) in intraparietal and submucous myo-
mata.

The initial pains cease when the tumor grows to
such an extent as to escape the tension of the walls
or, if the tumor is small and subserous, when it pro-
duces no further pressure symptoms. But new, labor-
like pains develop when the submucous tumor distends
the cavity of the uterus (Fig. 47, text); at the same
time the leucorrhœa and hemorrhage become more
pronounced. These pains inaugurate the dilatation
of the os (see Plate 16). If the tumor soon yields
and the pedicle becomes long and narrow, the com-
plete expulsion of the mass follows.

Diagnosis.—Small intraparietal myomata cannot
be recognized by palpation. We suspect them when
the violent, boring, initial pains run an apyrexial
course, and later, when menorrhagias and metrorrha-
gias develop, call for exploration of the cavity of the

uterus (after dilatation and with or without incision of the commissure of the os) and then enable us to recognize the submucous or even polypoid prominences, or perhaps a varying consistence of the uterine walls.

At a later period effacement of the os (see Plate 16) is recognizable in the speculum.

The differential diagnosis is furnished in the following chapter. Above all, pregnancy must be excluded before dilatation of the cervix is performed (menstruation does not cease, and the portio is not so livid or so soft).

Treatment.—Prophylactic treatment consists of the administration of ergotin subcutaneously (0.05 daily for months and years) in order to cause shrinking or elimination of the growth. In addition, ergotin, like hydrastis, checks the hemorrhages by stimulating the contraction of the smooth muscular fibres in the blood-vessels.

Both objects are aided effectively by hot vaginal irrigations (117–126° F., one or more litres several times a day or every two hours).

If violent hemorrhages cannot be checked, the vagina must be firmly tamponed with iodoform gauze and cotton. If this proves unsuccessful, Playfair's aluminum sound, covered with cotton which has been dipped in iron chloride, is carried into the uterine cavity or is even allowed to remain there for a couple of hours. At the same time ergotin is given subcutaneously and by the mouth.

But if the uterine cavity is dilated and the walls are flabby, liquor ferri sesquichloridi must be injected by means of Braun's syringe.

Symptomatically we must also combat the result of the hemorrhages, viz., anæmia (see § 4, under 7), the dysmenorrhœal and neuralgic disturbances (according to § 4, under 8, and also by salt or sool baths and bog or sool compresses on the abdomen).

Fibrous polpyi are removed by operation, like mucous polypi. If the tumors are large, they are diminished in size by longitudinal or spiral incisions or by the excision of pieces, until the pedicle can be enucleated. Then the uterine cavity is disinfected and tamponed with i o d o f o r m gauze.

FIG. 49.—Myxofibroma Ovarii with a Long Pedicle (rare). Specimen in Munich Gynecological Clinic.

Small submucous tumors are removed, after dilatation of the cervix, by incising the covering of mucous membrane and then enucleating the tumors which have been grasped with the aid of Muzeux's claw forceps.

Myomata of the cervix, which have grown into the parametral connective tissue, are eliminated after division of the vaginal mucous membrane covering them. Then a vaginal tampon is inserted.

§ 33. BENIGN TUMORS OF THE UTERINE APPENDAGES.

The visceral serous lining of the appendages with the subserous connective tissue and the smooth muscular fibres of the ligaments (broad and round), the papillated mucosa (covered with cylindrical epithelium) and muscular wall of the tubes, the cuboidal superficial epithelium of the ovaries (from which their germinal elements proceed), and the ovarian connective-tissue stroma are the tissue elements out of which the neoplasms under consideration proliferate (see "Atlas of Obstetrics," §§ 15 and 16).

We recognize the following forms:

1. Papillary proliferations of the tubes: circumscribed or diffuse, with or without the formation of cysts in the tubal mucosa; they are infectious in character.

2. Fibroma and fibromyoma of the tubes: solitary, from the size of a pea to that of a child's head; multiple, as the result of inflammatory proliferation (salpingitis nodosa, combined with hyperplasia mucosa and cyst formation) in the uterine isthmus portion of the tube, which is rich in muscular fibres.

3. Small fibromata and fibromyomata of the ovaries may develop from the corpora candicantia (see Plate 19, Fig. 3). At times they may attain large dimensions and then become serious, partly on account of a tendency to malignant degeneration, partly because they form a notable obstruction in parturition. They may exhibit a cavernous or cystic structure.

4. Fibromyomata of the round ligament very rarely occur intraperitoneally; * they are more frequent in the inguinal canal.

5. Fibromyxomata and fibromyomata of the broad ligament may grow to the superior strait of the pelvis and simulate hernia. They must not be mistaken for the uterine myomata which have grown between the layers of the ligament.

6. Lipomata of the tubes and broad ligaments are rare; the former attain only the size of a bean, the latter may weigh up to 15 kgm.

7. Cysts of the tubes and broad ligaments, serous in origin (with the exception of the mucous cysts mentioned under 1 and 2) are small. It is only in occasional cases that they assume practical importance, when they become provided with a pedicle (hydatids †) and adhere to the loops of intestine.

Unilocular cysts of the ovary are due to hydrops folliculorum. The multilocular cystomata of the ovary are devoid of importance only so long as they remain small.

Parovarian cysts develop from the remains of Wolff's duct (perhaps also from the remains of the primary kidney between the parovarium and uterus;

* I found one, upon autopsy, about as large as a small potato, and situated at the middle of the ligament. (Collection of the Munich Gynecological Clinic; v. Winckel's "Berichte und Studien," 1884–90).

† The development of hydatids is a frequent occurrence. In 180 autopsies I found them 45 times; in 8 cases there were several hydatids; in 3 cases there were 2 vesicles on one pedicle; several were calcified. Cysts of the broad ligament were found 15 times, of which 8 were calcified. I have also seen them repeatedly in the fœtus.

see "Atlas of Obstetrics," § 16). These structures usually remain small, but may grow to the size of a walnut or apple and then give rise to symptoms. They are situated between the ovary and tube and may be multiple. The walls of the cyst, which is always unilocular, are thin and consist of serous endothelium, subserous connective tissue with elastic and smooth muscular fibres. They are lined with ciliated or non-ciliated cylindrical epithelium. The contents are clear, usually poor in albumin, and therefore thin (diagnostically of importance in regard to puncture); specific gravity 1005, and they contain cylindrical cells.

Symptoms and Diagnosis.—Ovarian fibroma: see ovarian cystoma and following section.

Ovarian cysts (unilocular), see ovarian cystoma; for oligocystic degeneration, see § 17. An ovary may be cystic without undergoing enlargement. Nevertheless pains are felt, especially at menstruation, or difficult defecation, also on palpation. These pains are felt in the small of the back, occasionally as the so-called intermenstrual pain (see § 17). The pains are associated with dysmenorrhœa or, if the disease is bilateral, amenorrhœa and sterility.

This painful affection gradually imprints its traces on the patient's features, producing the facies ovarica. This is shown by compressed lips with resigned or tearfully depressed angles of the mouth, the skin around which is gradually furrowed; wrinkled forehead, sunken cheeks, prominent cheek bones, and peaked nose are noticeable.

If the tumor attains the size of a child's head, it causes pressure upon the rectum, bladder, vessels,

17

nerves, and uterus (vesical tenesmus, constipation, hemorrhoids, phlebectasiæ and neuralgias of the lower limbs, etc.). This begins the period at which ovarian cysts cease to be innocuous.

The diagnosis of ovarian cysts is made by bimanual exploration (if necessary, through the rectum), by the demonstration of a pedunculated tumor alongside the uterus and its identification with the ovary of the same side.

Parovarian cysts do not give rise to symptoms until they extend to the entrance to the pelvis, cause circulatory disturbances in the broad ligament, and thus produce nutritive changes in the ovary with the secondary menstrual anomalies.

If a distinctly circumscribed, fluctuating tumor can then be demonstrated alongside the uterus, from which a fluid, of the character described above, is evacuated on puncture, we have to deal with a parovarian cyst, especially if the tumor does not return after puncture.

Treatment.—Puncture or removal by kœliotomy should be performed if the parovarian cysts contain considerable albumin. The operation is simple if the tumor is pedunculated. When strong adhesions are present, they should be removed as far as possible and sutured.

If the cyst has grown between the folds of the broad ligament, it should be enucleated from the connective tissue. Otherwise excision of the corresponding part of the broad ligament is indicated.

Ovarian cysts which are not larger than an apple should not be removed unless they produce intolerable distress. Otherwise we give potassium iodide

in solution or in vaginal suppositories until iodism sets in. To relieve the pains we may order Priessnitz's compresses on the abdomen and pencilling with iodine; also rest during menstruation. In pelveoperitonitic symptoms we prescribe an ice-bag and rest in bed. Measures must be taken to secure easy movements from the bowels.

CHAPTER II.

TUMORS OF BENIGN STRUCTURE, WHICH MAY RUN A DANGEROUS COURSE UNDER CERTAIN CONDITIONS.

§ 34. FIBROMYOMATA.

The fibromyomata with grave results (ten per cent mortality) include all large, non-stationary muscular tumors of the vagina, uterus, and ovary, especially those which are intraparietal, intraligamentary, or have a broad base, i.e., all large neoplasms of this kind which are not polypoid.

The grave results of these tumors are:

1. Hemorrhages (due in later stages to the rupture of dilated, thin-walled vessels) which give rise finally to the most severe anæmia and to secondary disease of the heart.

2. The hemorrhages may also occur into the tissues of the tumor (Plate 41). These are due generally to circulatory disturbances with thromboses (occasionally they prove fatal as the result of embolism even after operation). Such extravasations are apt to suppurate and thus give rise to sepsis.

3. Torsion of the pedicle * gives rise, in large subserous polypi, to necrosis and inflammation of the tumor; in submucous polypi, to ulcerations and ichorous gangrene.

4. Inflammatory adhesions to the intestines may develop.

5. The submucous polypi may lead to inversion of the uterus (Fig. 48, text, and Plate 25) when they start from the fundus and when numerous strong muscular fibres still extend into the tumor from the uterine muscularis and thus interfere with its removal. Further sequelæ are compression-necrosis and gangrene.

6. By their large dimensions (as large as a man's head or more, especially when cystic) they give rise to impaction and traction of the pelvic organs † or they interfere with parturition (see "Atlas of Obstetrics," Figs. 96 and 97). They are more dangerous when they have undergone calcification.

The cysts are due to myxomatous degeneration, to absorbed extravasations of blood, or to œdematous softening and destruction of parts of the muscular fibres (the result of compression of the vessels or infectious thrombosis).

7. Intramural tumors may remain stationary in size as the result of fatty degeneration or they may

* There are cases in which the uterus itself is twisted around its axis, or even torn apart at the internal os. The tumors may also be torn off and enter the abdominal cavity. The nutrition is then maintained, as a rule, through the previously existing intestinal and omental adhesions.

† Above all, occlusions of the intestines, bladder, and ureters, which lead to ileus, absolute retention of urine, and uræmia, or to incontinence with secondary cystitis, pyelonephrosis, etc.

then grow smaller as the result of absorption. They may also undergo myxomatous degeneration and then exhibit a tendency to conversion into myxosarcoma (see Plates 47, Fig. 2; 53, Fig. 2), occasionally with intermuscular pseudocysts (Plate 47, Fig. 3) which are due to degeneration of round cells.

8. Primary metamorphosis of centrally located parts of the tissues into fibrosarcoma, and primary carcinomatous degeneration of the tumor itself or of the fungous, proliferated uterine mucosa.

9. The dangers of operative removal consist of hemorrhages and gangrene. In kœliotomy there is danger of peritonitis when the tumors have a broad base or are embedded deeply in the uterine walls and cannot be extirpated without opening the uterine cavity. Infections may also develop immediately or secondarily from rupture of an abscess which forms in the stump. Finally, pulmonary embolism occurs more frequently than in operations on other large genital tumors.

Symptoms.—In vaginal myomata we find only pressure symptoms. In large uterine myomata (for initial symptoms, see § 31):

When intramural, we observe menorrhagia, later metrorrhagia, also pressure symptoms, as in all these large tumors.

When submucous we find menorrhagia and metrorrhagia with violent colicky pains, because the tumors often displace the outlet and twist the uterus. In addition, slight perimetritic pains are observed. Sterility and abortion are frequent. The tumors are apt to become gangrenous in childbed.

When submucous and polypoid in character, the
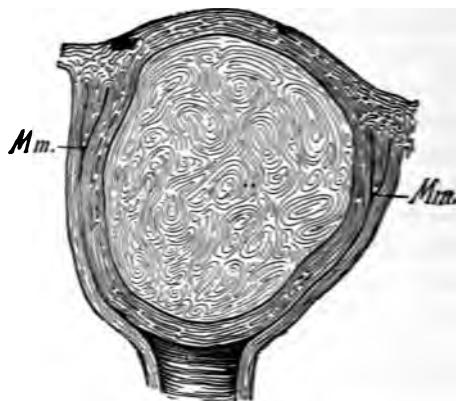
Fig. 50.—Intramural Fibromyoma of the Fundus Uteri, passing into the Vagina. *Mm*, Os uteri.
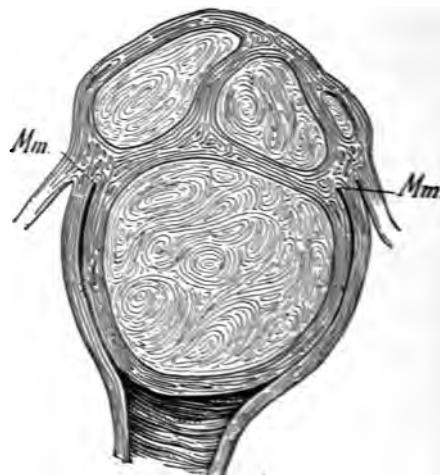
Fig. 51.—Multiple Intramural and Submucous Myomata of the Fundus Uteri, passing into the Vagina.

symptoms are like those of simple submucous growths; we also find labor-like pains, even independently of menstruation, because the uterus attempts to extrude the myoma pendulum. Ulceration and gangrene are apt to occur when the polypus remains in the vagina and undergoes œdematous swelling. This is followed by constant, non-remittent fever, even if there is no fetid discharge.

Catarrhal discharge is considerable, because the irritation of the fibrous polypi causes general proliferation of the mucous membrane, indeed multiple mucous polypi also develop.

In myomata of the cervix, menorrhagia and profuse leucorrhœa result.

If the myomata are subserous, the symptoms are slight, often not more marked than the pressure symptoms of the pregnant uterus (dyspnœa and even the reflex irritation of the mammæ, which begin to secrete, may often be present), unless the tumor gives rise to peritonitic irritation or neuralgias develop from pressure or reflex action.

At the menopause the tumors shrink, with rare exceptions, but the climacteric is very protracted.

In ovarian fibromyomata the symptoms are very variable; there is sometimes absence of menstruation or ascites.

Diagnosis.—In vaginal myomata we must ascertain whether they really start from the vaginal walls and do not have a pedicle in the uterus, because secondary adhesion of uterine polypi may occur.

In intramural uterine myomata the corresponding wall of the organ is hypertrophied and the uterine cavity is elongated.

A differential diagnosis from metritis and pregnancy must be made. In the former the wall is not so firm and the sound is not deflected from a straight path; in the latter the portio is livid and the entire organ is strikingly soft. The increase in size occurs in the manner typical of pregnancy and menstruation ceases.
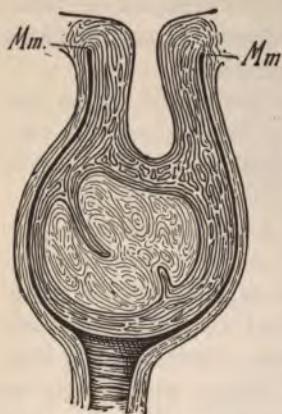
Fig. 52.—Intramural Fibromyoma of the Fundus Uteri, producing Inversion of the uterus. *Mm*, Os uteri.

If submucous or polypoid myomata are suspected, the cavity of the uterus is to be palpated after dilatation of the cervix. The sound is first introduced; the cavity is found enlarged but the sound is deflected at the site of the tumor or is unable to enter. At the menstrual period the tumor separates the lips of the os, and this is useful in diagnosis (see Plates 16, Fig. 2; 54). Traction with bullet forceps (aseptic) will show whether we have to deal with a long pedicle or a broad-based insertion.

If these tumors are very large (see Fig. 50, text) and project far into the vagina, it is often difficult to recognize their real origin without bimanual exploration from the rectum, perhaps with the coincident introduction of the sound.

In cervical myomata, especially if they have become gangrenous, a differential diagnosis from epithelioma of the portio must be made. In the former

we can demonstrate a pedicle which leads into the ostia. Moreover, the fibromyomata in this condition have a fibrous, shreddy character, and a brownish-red or pale rose color, while the cancerous nodules are softer and crumbly, and bleed very freely when broken off. The microscope decides between fibres and cancerous cell cones (see Plate 46, Fig. 2); the cancerous nodules and papillomata are always situated outside of the external os. Cancer of the cervix undergoes ulcerative destruction without exhibiting polypoid proliferations. Fibromyoma is distinguished from sarcoma by the greater firmness, slower growth, painlessness, and the absence of ichorous discharges with shreds of tissue. The transition of myoma into sarcoma is characterized by the development of these symptoms, associated with ascites. Myomata have also been mistaken for placental polypi and inversion of the uterus. In regard to the latter, see § 7. Placental polypi, like mucous polypi, are softer, and contain decidua cells, glandular epithelium, and chorionic villi (see "Atlas of Obstetrics," Figs. 58, 59).

It is often difficult to distinguish subserous and intraligamentary uterine myomata from other tumors of the appendages or of Douglas' sac, partly because the latter is filled up, partly because pelveoperitonitic masses of exudation may render impossible the definition of the embedded myoma. The sound will indicate the course of the uterine cavity so that we are able to know where the uterus and where the tumor are to be found (see Plate 42, Fig. 4).

In bimanual exploration we must also test the associated mobility of the uterus, when the tumor is pushed to and fro. This mode of examination is

especially important in subserous polypi with a long
pedicle (see Plate 44). It is to be noted whether
such tumors are firm. Fibrocysts or other very
œdematous tumors may exhibit fluctuation, like
ovarian cystomata. Here puncture aids the diag-
nosis. Myoma fluid coagulates and contains only
lymph corpuscles; it really is lymph. In pure
myomata fresh blood alone escapes. Thus it is only
the differential diagnosis from ovarian fibroma which
remains in doubt.

In sixty-six per cent of all myomata vascular mur-
murs may be heard; in cystomata they are rare.

If a myoma undergoes gangrene it becomes very
painful and fluctuates; febrile symptoms set in, with
septicopyæmic jaundice.

In ovarian fibroma the fact that the tumor starts
from the ovary is the main point in diagnosis (see
the following section). The further diagnosis is based
on the firmness of the tumor.

Treatment.—If the treatment with ergotin, men-
tioned in the preceding section, remains unsuccessful
and the tumor continues to grow, operative removal
is indicated if dangerous symptoms set in. The
treatment is unsuccessful if there is no change in the
menorrhagia after the daily injection of 0.2 ergotin
during two menstrual periods, *i.e.*, at least sixty to
eighty injections.

Larger submucous tumors are removed piecemeal
through the vagina (fifty-two pieces in one of v.
Winckel's cases) and, if they are gangrenous, should
be removed cautiously with polypus forceps, under
permanent irrigation (kolpomyotomy).

If enucleation, in the true sense of the word, fails

—and in very few cases are the intramural and submucous myomata distinctly encapsulated—it is often difficult to remove the growth, inasmuch as the finger is working in the dark in the uterine walls. The hemorrhage is checked by hot-water injections and the tampon, but sepsis is apt to set in.

Large intramural tumors, which are situated high up, and the subserous tumors are better adapted for cœliomyotomy.

There are four methods:

1. Myomotomy, *i.e.*, removal of the tumor from the uterus, which is left intact.

2. Supravaginal amputation of the uterus, *i.e.*, removal of the body of the uterus with its myomata from the cervix.

3. Total extirpation of the uterus by cœliotomy (Fritsch, Martin, Mackenrodt, Küstner).

4. Castration, *i.e.*, removal of both ovaries, because the experience that myomata shrivel at the menopause leads us to attempt the same object by a premature climacteric.

We must carefully weigh the question whether the disturbances and dangers produced by the tumors are as great as those due to operation (twenty per cent mortality from hemorrhage and sepsis, chiefly from the opened uterine cavity).

Indications for the operation are:

1. Extremely exhausting hemorrhage.

2. Inability to work.

3. Very rapid growth, so that life will probably be endangered (especially when combined with cystic degeneration).

4. Suppuration of the tumor.

5. Torsion of the pedicle with symptoms which threaten life.

I. Myomotomy is practicable in subserous polypi and those subserous or intramural myomata which can be enucleated from the uterine walls.

If the uterine cavity is opened at the same time or the mucous membrane alone remains as a thin lamella, then—

II. Supravaginal amputation should be performed.

In many cases it is only after the abdomen has been opened that we can decide whether and how amputation is to be performed. It is indicated in broad-based subserous, in large or multiple intramural, in intraligamentary, and in gangrenous or otherwise degenerated (cystic, cavernous, carcinomatous) tumors which do not project far into the uterine cavity.

Around the uterus and appendages (to the side of the ovaries) is applied, as deeply as possible, an elastic tube (after the manner of Esmarch's bandage). Then the broad ligaments are ligated in three portions from the infundibulopelvic ligament as far down as possible and close to the uterus; next the uterus with the tumors and appendages is removed. If intraligamentary tumors are found, the broad ligaments are separated, after the projected site of incision has been ligated on both sides in three portions. The rubber ligatures may be allowed to remain permanently.

The stump is treated in various ways:

1. Schröder's intraperitoneal treatment: wedge-shaped excision and cauterization of the stump (with concentrated carbolic acid, zinc chloride, or Paquelin);

three layers of sutures (catgut) are applied in order to close the mucosa, muscularis, and serosa.

There is danger of secondary infection, *i.e.*, the formation of abscesses in the stump and rupture of the sutured serosa.

2. Péan - Hegar's extraperitoneal treatment: the stump is placed, by means of long needles inserted crosswise, in the lower angle of the abdominal wound and outside of the peritoneum (the serosa of the stump is united to that of the abdominal walls), *i.e.*, it is only covered by the muscles of the abdominal walls. The necrotic stump is exfoliated, with the rubber tube, at the end of two or three weeks. The disadvantage consists of the permanent, not inconsiderable traction of the bladder.

Fritsch treats the stump in a manner similar to that of Schröder, except that he uses sagittal instead of transverse sutures, and then sews it into the lower angle of the abdominal wound. On the ninth day he removes the sutures from the stump in the depths of the wound.

Chrobak places the stump retroperitoneally and thus extraperitoneally.

III. Total extirpation by kœliotomy offers the greatest security against secondary infection of the abdominal cavity by the constant secretion of the stump of the cervix which takes place in supravaginal amputation.* Ligature of the spermatic vessels; transverse incision in the vesico-uterine excavation, also

---

* In the Heidelberg Gynecological Clinic thirty myomotomies by kœliotomy according to the retroperitoneal method were attended by two deaths, one from pulmonary embolism, the other from extreme anæmia.

at the bottom of Douglas' sac; successive ligature
and division of the ligaments. Amputation of the
cervix is made in such a way that very little remains
at the external os. Closure of these wounds is
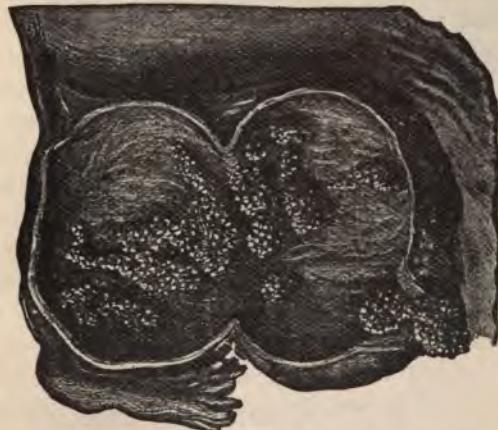
Fig. 54.—Cystoma Proliferum Papillare, characterized by the fact that
the epithelium not alone produces glandular, *i.e.*, follicular and cystoid
structures, but also conglomerations of papillary formations on the
walls of the cysts. These dendritic proliferations are either found upon
the inner surface of the cysts alone, or also upon the outer surface, and
in this event they not infrequently grow through the walls. They give
rise to metastases upon the serous lining of the entire abdomen, and
produce ascites. Macroscopically they cannot be distinguished from
the similar but somewhat firmer carcinomatous variety.

effected by non-draining material (silkworm gut);
catgut ligatures are passed through the parametral
cellular tissue and the serosa.

IV. Hegar's castration is merely a makeshift and
should only be performed when the removal of the
myomata is regarded *a priori* as dangerous to life (in
the case of very large tumors, which cannot be forced

out of the pelvis on account of the presence of multi-
ple subserous nodules in various directions).   More-
over, this operation is attended with a mortality of
sixteen per cent, because the ovaries are often situ-
ated so close to the tumors that ligature of the vessels
becomes very difficult.   In many cases, also, the
expected effect was not attained.

The operative removal of ovarian fibromata is in-
dicated on account of the danger of malignant degen-
eration, even if they are moderate in size and remain
stationary.   The dangers of the operation consist in
the hemorrhages, especially from the adhesions.
Hence an elastic rubber ligature and broad, strong liga-
tures of the pedicle before the removal are indicated.

Preliminary and after-treatment in all these kœli-
otomies is the same as in removal of ovarian cysto-
mata.

§ 35. Ovarian Cystomata.

For definition, anatomy, and histology, see Plates
36, Fig. 4; 43, Fig. 2; 47, Figs. 4 and 5; 62, Fig.
3; Figs. 53 and 54 in the text; "Atlas of Obstetrics,"
Fig. 88.

Cystomata may be attended with serious results:

1. On account of their growth beyond the size of a
man's head;

2. On account of strangulation as the result of tor-
sion of the pedicle with hemorrhage, inflammation,
suppuration, sloughing, septicæmia;

3. On account of intestinal adhesions with torsion
and constriction of the gut;

4. On account of rupture of the tumor, followed by
pseudomxyoma of the peritoneum (Werth);

5. On account of carcinomatous degeneration;

6. On account of fatal heart failure or uræmia.

Symptoms (see the initial symptoms in § 32).—
Pressure symptoms usually appear only after the
tumor has attained the size of a child's head and re-
mains impacted in the pelvis (constipation, difficulty
in micturition, neuralgias). Dyspnœa and swelling
of the thoraco-abdominal veins, œdema and pressure
on the ureters are produced, and finally the patient is
confined to bed.

The diagnosis is based on the demonstration of the
pedicle and of the differentiation of the tumor from
the uterus, if necessary by Schultze's method (see
Plate 62, Fig. 3) ; also on the demonstration of fluctu-
ation. In contrast to ascites percussion reveals a
line of dulness which is convex superiorly, with an
intestinal tympanitic tone above and to the side.
Ascites may also be present. On auscultation vascu-
lar murmurs are heard much more rarely than over
myomata. The uterus is generally found in front
and under the tumor (Plate 43), more rarely it is
retroverted (Plate 36, Fig. 4); when pregnancy oc-
curs, the organ may undergo total prolapse ("Atlas
of Obstetrics," Fig. 88). The uterus does not move
with movement of the tumor. The pedicle is pal-
pated to the best advantage through the rectum; it
starts from one angle of the uterus (Plate 62, Fig. 3).
Dermoid cysts are generally located in front of the
uterus in the vesico-uterine excavation. The fluid
obtained on puncture gives the following findings:

(*a*) Microscopically, see Plate 47, Fig. 5.

(*b*) Chemically; golden yellow to dark brown
(blood) color, specific gravity 1010–1024; colloid con-

18

sistence due to the presence of pseudomucin (metal-
bumin); hence the demonstration of the latter is im-
portant. The chemical differentiation of the mucoid
and albuminous matters in cystomata (the latter
undergo changes analogous to those of digestion) is
the following:

Mucus Series.	Albumin Series.	Precipitation or Solubility.
1. The matter of the colloid corpuscles— changed cell parenchyma.	1 a. Albumin. 1 b. Soda albuminate.	1. Precipitated by boiling and acetic acid.
2. Mucin.	2. Paralbumin (pro-peptone).	2. Precipitated by boiling and acetic acid.
3. Colloid matter (soluble in water).	3. Metalbumin (pseudomucin) insoluble in water.	3. Precipitated by alcohol, not by mineral acids.
4. Mucin peptone.	4. Albumin (fibrin) peptone.	4. Precipitated by neutral metallic salts, ferrocyanide of potassium, tannin; soluble in water.

The albumin series is distinguished from the
mucus series by the fact that it contains nitrogen and
sulphur and is precipitated by tannin and neutral
metallic salts.

Metalbumin is obtained in the following way: by
boiling and the addition of nitric acid all the albu-
min, including paralbumin, is precipitated and fil-
tered; the mucins are removed at the same time, and
then, upon the addition of alcohol, the metalbumin
falls to the bottom in the shape of white flocculi; the
previous addition of acetic acid alone causes cloudi-
ness but no precipitation. Metalbumin is distin-
guished from the corresponding colloid matter by its
non-solubility in water and its precipitation with
ferrocyanide of potassium.

For more delicate examinations we need the reduction test with ten per cent copper sulphate (Trommer's sugar test).

Chemical Differential Diagnosis.—For ascites transudate and exudate, see Plate 42, Fig. 1.

Parovarian cysts: the contents are clear as water, specific gravity 1002–1006, rarely albuminous; we usually find ciliated epithelium without other formed elements than blood corpuscles.

Hydrosalpinx: the fluid is serous, mucoid or gritty; it is rich in albumin; cholesterin, often blood corpuscles, and cylindrical epithelium are present.

Hydronephrosis: the fluid contains much urea, demonstrable by evaporation and extraction with alcohol; when a little water and concentrated nitric acid are then added, rhomboid plates of nitrate of urea can be seen. Low specific gravity; little albumin.

Echinococcus sacs (they occur upon the genitalia in four per cent of all cases, chiefly in the submucous layer of the uterus and in Douglas' sac): specific gravity 1007–1015; they contain hooklets; no albumin, but much sodium chloride and succinic acid. The latter is obtained by evaporation, then dilution with water and extraction with ether. After evaporation there are left over monoclinic prisms, six-sided plates of succinic acid, or the watery solution gives a rust-colored, flocculent precipitate with ferric chloride.

I. Intra-uterine Tumors.

Differential Diagnosis.—1. Pregnancy: in this we find absence of menstruation, uniform growth in the well-known manner, and, from the fifth month, detec-

tion of fœtal parts and movements, and audible heart sounds. Previously a livid, fluffy portio and characteristic softness of the uterus at the internal os (bimanual exploration through the rectum) are noticeable. On the other hand, the uncertain signs of pregnancy, even secretion from the breasts, are worthless, because they also occur in cystomata. The sound and trocar should not be used until pregnancy is positively excluded.

Retroflexion of the gravid uterus (see "Atlas of Obstetrics,' Fig. 85, § 34) merits special mention. The chief symptom is ischuria. It must also be remembered that the fœtus may have died (chills).

2. Hæmatometra with or without hæmatosalpinx: if congenital, menstruation has always been absent; if acquired, the menses have ceased only since a certain time. Hence the permeability of the vagina and cervix must be tested with the sound.

3. Intramural and submucous myomata are characterized by menorrhagia, labor-like pains, and slower growth than in cystomata. They exhibit a firm consistence, and usually vascular murmurs; the cavity of the uterus is elongated. They are frequently combined with cystomata.

II. Pedunculated Tumors of Uterus and Appendages.

4. Subserous uterine myomata exhibit the same symptoms as above; in addition there is associated movement of the portio on moving the tumor, but in the opposite direction. The consistence is firm, except in the case of cystofibromata or œdematous tumors. On the other hand cystomata may grow hard from extravasation of blood after torsion of the pedicle.

5. Intraligamentary uterine myomata, as in 3 and 4. These are firmly adherent to the uterus and are distinguished from intraligamentary cystomata only by their hardness.

6. Hydrosalpinx and pyosalpinx, hæmatosalpinx: the clinical history, fever, and tenderness are characteristic. We also find lateral position, with the shape of a sausage or trumpet, and with constrictions (see Plate 20); puncture.

7. Parovarian cysts: these are round, very fluctuating, unilocular, *i.e.*, not nodular, and are closely applied to the uterus; the pedicle is absent or very short; puncture.

8. Ovarian fibromata have a uniform firm consistence, a surface showing small nodules; the growth is slower.

III. Tumors of Douglas' Sac.

9. Abdominal pregnancy: we find amenorrhœa for a certain period, pains, and perhaps discharge of the decidua. The sac is fluctuating and non-pedunculated and contains parts of the fœtus.

10. Intraperitoneal retro-uterine hæmatocele: this develops suddenly with collapse; a fluctuating tumor fills Douglas' sac as far as the uterus; the vaginal fornix is tender. No explorative incision should be made.

Extraperitoneal peri-uterine hæmatocele leaves Douglas' sac intact and lies to the side of the uterus.

11. Fluid exudative peritonitis runs a febrile course with violent pains, distention of the abdomen, vomiting; there is often diarrhœa and inability to walk. At first a fluctuating or doughy, later nodular tumor is felt with an immovable uterus.

12. Parametral tumors are similar to the preceding; they are situated laterally or posteriorly above the fornix. Shrunken intraligamentary abscesses are connected with the angle of the uterus.

13. Rectal tumors are rare, occasionally adherent to cystomata; from the rectum they are felt to be located in the wall itself; there is intestinal stenosis. It is often impossible to decide whether a cystoma is not adherent to the rectum.

14. Tumors of the pelvic bones are united immovably to the latter and grow slowly. Above all we must look for the ovaries because a cystoma, which is adherent to the pelvis, may simulate the same findings on palpation.

15. A rare lesion is anterior sacral hydromeningocele, *i.e.*, a serous hernia of the dura mater between the body and wings of the sacrum.

IV. Other Abdominal Tumors.

16. Floating kidney: this is a bean-shaped, firm, somewhat sensitive tumor; movable upward into the position of the kidney, where the percussion sound is tympanitic; no pedicle is found leading to the pelvis.

17. Hydronephrosis: this condition is of long duration, growing downward from the lumbar region, without a pedicle leading to the pelvis; the intestine passes in front of it, while in ovarian tumors it passes behind or above it; puncture (see above) is indicated.

18. Echinococcus vesicles of the kidneys, liver, pelvis: hydatid thrill is felt; puncture (see above) is indicated.

19. Splenic enlargement extends from the left side

of the abdomen to the pelvis, but without sending a pedicle into the latter; leukæmia is found.

20. Omental tumors: adhesions in tuberculous and carcinomatous processes are not pedunculated toward the pelvis, hence a tympanitic sound or ascites is found below them; the ovaries are normal.

21. Pancreatic cysts: there is absence of a pedicle into the pelvis.

22. Tumors of the bladder: adhesions to cystoma; there are characteristic vesical disturbances. The urine should be examined for evacuated shreds of tissue; if necessary, the urethra is to be dilated.

23. Tumors of the abdominal walls and parietal peritoneum: they adhere firmly to the skin and their contours are felt with great distinctness. During respiration the tumor moves from before backward with the movement of the abdominal walls (intraperitoneal tumors move from above downward with the diaphragm). In all positions of the body the tumor maintains the same relation to its starting-point in the abdominal walls. At the moment of contraction of the abdominal muscles the contours of the tumor are flattened, but upon it are felt the contracted fibres; the tumor then is located in the parietal peritoneum or the fascia transversalis. But if the tumor becomes more prominent, it belongs to the muscular walls if it remains firm during the tension; it belongs to the subcutaneous or præmuscular connective tissue, if it remains movable.

Fluctuating tumors of the lower abdominal region must arouse the suspicion of perforating perimetritic or parametritic abscesses; of a cold abscess, a psoas abscess, if a tuberculous lumbar kyphosis is present;

a swelling on the right side should make us think of perityphlitis or typhlitis. It is to be remembered that similar symptoms may be produced by pus tubes which are adherent in the vesico-uterine excavation.

V. Simulated Tumors.

24. Distended bladder.

25. Ascites (see Plate 42, Fig. 1).

26. Fat abdominal walls.

27. Meteorism: a tympanitic sound is heard everywhere; the genitalia are normal; no hardness (socalled "phantom tumor") is felt.

Prognosis.—Ninety per cent of all cystomata larger than a head terminate fatally by rupture and peritonitis, gangrene or exhaustion. Malignant degeneration is always possible. Dermoid cysts are apt to suppurate or undergo cancerous degeneration. A dangerous event is

Torsion of the pedicle: circulatory disorders with phlebothrombosis or hemorrhagic extravasations into the tumor and rupture of the latter, or nutritive disturbances and secondary retrogressive metamorphosis, with necrosis if it occurs slowly (Plate 47, Fig. 4), and with gangrene if it occurs rapidly.

Diagnosis of sudden torsion of the pedicle: there is sudden increase of pains; the tumor, and often the abdomen, are tender on pressure, so that the patient walks bent over forward; reflex nausea is produced and moderate evening rise of temperature with morning remissions.

Treatment (see § 32).—If a cystoma is as large as a child's head it must be removed; even pregnancy does not constitute a contraindication. Even smaller

cystomata are best removed by ovariotomy, especially when they produce violent pressure symptoms or nervous disturbances or interfere in other ways with the ability to work.

Puncture should be performed only for special reasons; for example, when ovariotomy is refused, during parturition, when contraindications to ovariotomy are present, such as extreme dyspnœa or other pressure symptoms, malignancy, feeble heart action with œdema, etc., extreme anæmia, pulmonary tuberculosis, nephritis, or other incurable constitutional affections.

Puncture is to be performed with Bresgen's trocar or Potain's apparatus, with strict asepsis and avoidance of the entrance of air. It is performed from the abdominal walls or vaginal fornix. The trocar and rubber tube are first filled with sterilized water and the tube is dipped into a vessel which also contains sterilized water. Then the air cannot be sucked in, for example, by a tumor which falls backward. In order to make this still more certain, the tumor is stitched to the abdominal walls (this also prevents the entrance of fluid into the abdominal cavity) and the cyst is evacuated by suitable posture, not by manual pressure. The puncture is closed with adhesive plaster (in the shape of a Maltese cross) or a bandage. The fluid should be allowed to escape slowly, in order to avoid collapse.

Ovarian cystomata rarely shrivel after puncture, but refilling usually occurs and is attended with great prostration of the patient. On the other hand extirpation, under the present aseptic methods, is attended by only 4.5 per cent mortality (Fritsch).

Last year at the Heidelberg Gynecological Clinic there was only one death in sixty kœliotomies (extreme anæmia in myomatosis), so that there was really not a single death among the ovariotomies.

Ovariotomy is performed soon after menstruation under the strictest demands of antisepsis, so far as regards the operating-room (heated to 73°–77° F. on account of the large surface of evaporation presented by the intestines) which is reserved exclusively for this purpose, as well as the clothing, utensils, etc., which come in contact with the patient and attendants during the operation. The instruments and gauze compresses are boiled and are kept, during the operation, in sterilized water. In other words, everything that comes in contact with the wound may no longer exhibit caustic antiseptic properties (which may give rise to necrosis of the endothelium and adhesions) but must be moist aseptic. Accordingly the hands and arms of the operator, assistants, and nurses are first treated with soap, brush, and hot water, then with alcohol and brush, finally with a solution of corrosive sublimate and the brush. Before the abdominal incision is made, they are washed with sterilized physiological (0.6 per cent) solution of sodium chloride; the latter procedure is repeated frequently during the operation.

The Trendelenburg-Veit position (high pelvis) is usually the most suitable; the knee is the highest part of the body, which lies on a wedge-shaped mattress (the intestines then fall toward the entrance of the pelvis and away from the wound; protection against cerebral anæmia; narcosis is effected more quietly). Other operators (v. Winckel, Martin) use

Mrs. Horn's small operating table and sit between the patient's legs which either hang down (see "Atlas of Obstetrics," Fig. 32 a) or rest upon two lateral supports (in the former event the inclination of the superior pelvic strait to the horizon is 10°, in the latter 25°, so that in the former the tumor is pressed more forcibly upward against the abdominal walls).

A full bath is given to the patient on the day before the operation. The abdominal walls are then shaved, treated in the same way as the hands of the operator (described above), and then covered during the night with a moist compress of corrosive sublimate (Fritsch). But as the infectious germs may be located deep within the cutaneous glands and in the deeper layers of the epidermis, this procedure must be repeated immediately before the operation, especial attention being paid to the umbilicus, old cicatrices, or other irregularities in the skin.

For one or two days prior to the operation the diet should be fluid but nourishing (bouillon, eggs, milk, coffee), and at the same time the bowels should be freely evacuated (infusion of senna by the mouth and enema). The bladder is evacuated immediately before the operation. The vulva and vagina are thoroughly disinfected and tamponed with iodoform gauze, in case it becomes necessary to open the fornix or to make any other manipulations through the vagina.

The operation itself should not be performed by any one who has not repeatedly watched it as assistant or has carried it out under supervision. For this reason I will merely mention a few important facts, especially as there is no typical mode of operation for tumors which may be complicated with numerous ad-

hesions, inflammatory encapsulations, intraperitoneal pus-sacs, and hemorrhages. The mode of operation is best learned from observation, calm judgment of every fresh difficulty, manual skill, and the careful consideration of all the possible dangers in a given case.

After dividing the abdominal wall in the linea alba the peritoneum is raised with forceps and opened in this way, so as to avoid injuring the intestines; the further division of the serosa is done with the scissors under the protection of the introduced finger.

The incision should be made as long as possible; it is better to have a good view and to remove the tumor as much as possible without diminishing its size. If this cannot be done, the tumor is brought nearer to the abdominal walls by means of hooks, and the fluid is discharged externally by means of the trocar and incision.

Loose adhesions are stripped off; firm ones are ligated and then divided; broad adhesions are treated in the same way and, if necessary, a part of the tumor wall is removed with them. The adhesions are sometimes so vascular that they nourish the tumor. If parenchymatous hemorrhages develop when there are extensive adhesions of the organs, and particularly in case of adhesions to the abdominal walls (in which the detachment of the parietal serosa, which is very thick and easily mistaken for the wall of the tumor, must be avoided), then acupressure must be adopted or, when located deep in Douglas' sac, we must resort to the Paquelin cautery, liquor ferri sesquichloridi, or tamponing with iodoform gauze toward the lower angle of the wound or the posterior fornix.

It must be ascertained whether the other ovary is sound; it should be removed if its condition is suspicious.

The pedicle of the tumor must be ligatured very carefully. The ligatures are passed through and around it several times, and finally, before definitive closure of the abdomen, must again be examined, free from tension, not alone in order to see whether the pedicle is still bleeding, but also whether a hæmatoma of the pedicle has not developed from retraction of an open vessel. Then the compresses must be counted.

The abdominal sutures may be applied in various ways:

1. Union of the individual layers of the abdominal walls to one another (step suture): suture of the serous layer with catgut (this would unite spontaneously in a few hours); suture of the muscular layer with catgut or silkworm gut or both joined with silver wire; cutaneous suture, superficial or again passing deeply, with silk, silkworm gut, or silver wire.

2. In two layers with two sutures: the internal seromuscular suture of catgut, silkworm gut, or silver wire; the cutaneo-muscular suture as in 1.

3. In two layers with a figure-of-eight suture: a doubly armed silk thread enters, with one needle (seromuscular) on one side and is then carried (cutaneomuscular) to the other side; the same thing is done with the other needle. In this way the lower loop of the eight, when drawn tight, includes the serous and muscular layers; the upper loop includes the muscular layer and skin. In drawing the ligature tight, one finger is used to ascertain whether a loop of intes-

tine has been entangled and whether the serous layers
are firmly applied to one another.

The more closely the sutures are applied (1.5-1
cm.) the less the danger of separation (diastasis) of
the recti muscles. Between the upper deep sutures
are placed superficial skin sutures, the edges of the
integument being smoothed out and applied closely to
one another.

Dressing and After-Treatment.—Dermatol upon the
wound, salicylated gauze, cotton; towel bandage. If
no accident occurs, the dressing is changed in a few
days; removal of the sutures on the tenth day; any
silk sutures which may be suppurating are removed
earlier and carbolic acid compresses applied.

Immediately after the operation we must secure
diaphoresis (warm bed), partly in order that the col-
lapse may pass over quickly, partly in order that
as little transudation as possible may be contained
in the abdomen and thus serve as a fertile soil
for any infectious germs which may have entered
(Fritsch). For this reason we order on the first day:
very little fluid, except stimulating drinks, a little
wine, brandy or rum mixed with water, bouillon, per-
haps coffee, and pieces of ice to relieve thirst. The
patient is kept warm constantly. If collapse is pro-
tracted, an enema of wine or ether is given. Severe
collapse at a later period is due to internal hemor-
rhage and the wound must be reopened.

First week: give fluid, nourishing food. On the
second day infusion of senna* by enema is given in

* The author has compared the observations, made for years,
in two clinics, one of which adopted the opium treatment in
order to keep the bowels quiet, the other the senna treatment,

order to prevent the development of intestinal adhesions (Kehrer).

Then two enemata are given daily, aided, if necessary, by mild cathartics. If the urine is not voided spontaneously, catheterization is performed twice a day with the greatest care. Dorsal decubitus is ordered ; only when there is danger of pulmonary hypostasis is lateral decubitus (cautiously) allowed. Vomiting is the result of the swallowing of chloroform (pieces of ice and cold champagne), meteorism, constipation, or peritonitis. The bed is not changed until the beginning of the

Second week: easily digested, solid food (lamb, chicken, zwieback, bread, etc.) is given. If the condition has been perfectly satisfactory, this may be done as early as the fourth or fifth day.

In the third week the patient is allowed to rise.

In meteorism: use Priessnitz's compresses, oil of peppermint, fennel tea. When combined with severe vomiting, elevation of temperature, tenderness, formation of exudation in the abdomen, it indicates peritonitis. We then recommend inunctions of mercurial ointment and administration of calomel (see page 164).

If there is severe sudden collapse associated with anæmia, it is due to internal hemorrhage and the wound must be opened forthwith; if associated with dyspnœa and cyanosis (especially in fibromyomatous· tumors), it indicates pulmonary embolism.

For the treatment of encapsulated exudation after recovery from peritonitis, see § 18.

and has decided unreservedly in favor of the latter, especially as the subjective condition of the patients is much better.

SCHEME OF THE DIFFERENTIAL DIAGNOSIS OF ANTE-UTERINE AND RETRO-UTERINE TUMORS.

A. FLUCTUATING RETRO-UTERINE TUMOR.

SLOW GROWTH WITHOUT FEVER.

Fundus Uteri

Passes into the tumor in Douglas' sac.

1. Retroflexi-on of the gravid uterus.
2. Intra-ute-rine cystic myoma.
3. Haema-tometra.
4. Echinococcus cysts of the uterus (submucous).

Distinct from the tumor in Douglas' sac.

1. Ovarian or parova-rian cyst.
2. Hydro-salpinx.
3. Abdomi-nal preg-nancy.
4. Echinococcus cysts of the uterine appendages and pelvis.

RAPID GROWTH WITH FEVER.

Fundus Uteri

Passes into the tumor.

1. Indurated para-metritis (Doug-las' sac free).
2. Indurated exu-dative peritoni-tis.
(Both attended with fever.)

Distinct from the tumor in Douglas' sac.

1. Fluid exu-dative per-itonitis.
2. Intraper-itoneal retro-uterine haemato-cele.
3. Exudative parametritis and extra-peritoneal peri-uterine haematocele (Douglas' sac free).

B. SOLID RETRO-UTERINE TUMOR.

Fundus Uteri

Passes into the pelvic tumor.

1. Intra-uterine, in-traligamentary, and broad-based subserous fibro-myomata of the uterus.

Distinct from the pelvic tumor.

1. Subserous polypoid fi-bromyomata of the uterus.
2. Ovarian fi-broma and carci-noma.
3. Pelvic tu-mors.
4. Rectal cancer.

C. FLUCTUATING ANTE-UTERINE TUMOR.

SLOW GROWTH WITHOUT FEVER.

Passes into the tumor.

1. Physiolog-ical ante-flexion of the gravid uterus.
2. Intra-ute-rine cystic myoma.
3. Hema-tometra.

Fundus Uteri

1. Dermoid cysts of the ovary (generally here; mul-tilocular cysts rarer here).
2. Hydrosal-pinx (more frequent here).
3. Abdomi-nal preg-nancy (rare here).

RAPID GROWTH WITH FEVER.

Distinct from the tumor.

1. Fluid ex-udative perito-nitis (rare).
2. Intraperi-toneal an-te-uterine hemato-cele (rare here).
3. Anterior ex-udative par-ametritis and extra-peritoneal peri-uterine hematocele.

D. SOLID ANTE-UTERINE TUMOR.

Fundus Uteri

Passes into the tumor.

1. Intra-ute-rine and broad-based sub-serous fi-bromyo-mata uteri.
2. Indurated exudative peritonitis (rare here). (Both begin with fever.)
3. Indurat-ed para-metritis.

Distinct from the tumor.

1. Subserous pol-ypoid fibro-myomata uteri.
2. Ovarian fi-broma and carcinoma (rare here).
3. Tumors of the bladder.
4. Vesical cal-culi.
5. Tumors of the anterior part of the pelvis.

19

CHAPTER III.

MALIGNANT TUMORS.

The malignant tumors are divided into *epithelioma, i.e.*, pavement epithelium tumors or cancroids, malignant glandular proliferations or malignant adenoma (glandular cancer), malignant papillo-glandular ovarian proliferations or malignant papillary cystoma—*sarcoma, i.e.*, round cell and spindle-cell proliferations with or without mucous degeneration or pigment deposit in the fibrous tissue—and *endothelioma, i.e.*, vessel endothelium proliferation or angiosarcoma, as it is intermediate between epithelioma and desmoid.

§ 36. MALIGNANT TUMORS OF THE VULVA, BLADDER, AND VAGINA.

We find:

Upon the vulva: (1) epithelioma (Plates 2, Fig. 2; 45, Fig. 1); (2) fibrous carcinoma (rare); (3) glandular carcinoma of Bartholin's glands; (4) sarcoma (Plate 47, Fig. 3).

In the urethra: (5) epithelioma (very rarely primary).

In the bladder: (6) villous cancer (Plate 57, Fig. 5); (7) diffuse scirrhus of the entire wall; (8) multiple nodular carcinoma; (9) sarcoma (very rarely primary).

In the vagina: (10) papillary epithelioma (Plates 45, Fig. 2; 52, Fig. 1; 57); (11) superficial, diffuse,

carcinomatous infiltration (Plate 52, Fig. 1; Plate 57); (12) sarcoma (Plates 46, Fig. 3; 47, Figs. 2 and 3).

Symptoms and Diagnosis.— Vulvar Epithelioma : pruritus is often present a long time before the eruption of nodules, in the shape of small, flat, reddened prominences. Later the edges become livid and firm; there are small papules in the surrounding skin. Early ulceration and metastases of the inguinal glands are observed. The ulcer has irregular borders with hard tissue around it. The patients are past the age of forty years.

Vulvar Sarcoma is found in young patients and may even be congenital; the tumor is fibrous.

Cancer of the Bladder : For symptoms, see § 31 under "Bladder." The tumor consists of soft, brittle, fibrous, polypoid masses. These are apt to tear off and do not consist, as in a fibrous tumor, of intact villi but of degenerated shreds of tissue. Metastases form quickly and embolism is frequent; peritonitic symptoms. The lesion is usually secondary.

Vaginal Epithelioma : pruritus is also present; there are irregular hemorrhages. Pains are experienced during coitus and spontaneously. Purulent and ichorous discharges occur after ulceration, with the passage of fetid, easily crushed particles. Gradually vesical disturbances set in and finally a fistula forms. For microscopical appearances, see Plate 45. After diagnosis, an exploration must be made to determine whether it is not secondary to cancer of the portio (see Plate 57). Papillary cancer usually begins anteriorly with a broad base (chronic vaginitis). The nodular form is generally peri-urethral; the nodules rapidly coalesce and soon ulcerate.

Similar appearances are presented by *sarcoma*. For the microscopical findings, see Plates 46 and 47. Death occurs from venous metastases, septicæmia, or hemorrhages; relapsing fibromata or polypi are suspicious.

Treatment.—All these tumors must be removed immediately after diagnosis, with the knife and Paquelin cautery. The line of extirpation must be entirely outside the infiltrated zone. Glandular metastases are not to be neglected. At the climacteric every suspicious large or moist warty prominence upon the vulva should be removed as a matter of prophylaxis. They should not be cauterized for any length of time.

In urethral carcinoma incontinence does not develop so long as the sphincter remains intact. When operative removal is not feasible, we should secure rapid evacuation of the decomposing urine and disinfection of the interior of the bladder.

When cancer of the bladder forms a circumscribed villous tumor, the corresponding part of the wall of the organ should be removed; in diffuse superficial formation of nodules, they should be enucleated with a sharp spoon. Irrigation with a solution of salicylic acid; in hemorrhages, injections of ice water, ice-bag, and vaginal tampons. For a few days the clots should be removed with a large catheter.

§ 37. Malignant Tumors of the Uterus.

I. Uterine Carcinoma.

For the special forms of uterine cancer see:
1. Plates 45, Fig. 2; 50, Fig. 2; 54, Fig. 1; 57,

Figs. 1–4; 59, Fig. 2, epitheliomatons papillary tumor of the portio vaginalis;

2. Plate 52, Fig. 1, superficial epithelioma of the portio and fornix vaginæ;

3. Plates 45, Fig. 3; 51; 54, Fig. 2; 55; 58, epitheliomatous ulcer of the cervix;

4. Plate 52, Fig. 2, nodular cancer of the cervix;

5. Plate 58, Figs. 3 and 4, superficial epithelioma of the corpus uteri;

6. Plates 7, Fig. 3; 53, Fig. 1, glandular cancer, malignant adenoma of the corpus uteri.

Symptoms.—It is extremely important to detect these tumors as early as possible, because it is only prior to the formation of lymphatic metastases that there is a prospect of elimination without relapse.

In almost all cases the initial symptoms are hemorrhages, discharge (at first glairy and mucous, then purulent, then sanguino-purulent, with or without broken shreds of tissue), pains (occasionally pruritus). Finally, the fluid and solid constituents of the discharge assume an ichorous character.

Less marked hemorrhages and pains favor the diagnosis of cancer of the body of the uterus.

The irregularity of the hemorrhages at this period of life, the menopause, is apt to mislead the patient and the physician, and the examination must therefore be made so much more carefully.

The pain is tearing and lancinating and radiates into the small of the back and thighs; it is not constant. In carcinoma of the corpus uteri it occurs in colic-like paroxysms, attended by the discharge of firm particles from the cavity of the organ. Other causes of pain are pressure on the nerves, neuritides,

irritation of the still intact soft parts by the ichorous cancer juice, the formation of fistulæ, and the vesical catarrh which develops later.

All forms of vesical disorder set in; vomiting and headache appear early, from pressure on the ureters; the urine is always diminished in amount.

With the later affection of the walls of the bladder (usually in the trigonum with occlusion of the ureters from the rigid infiltration) the uræmic symptoms assume an undeniably typical character. Anuria is almost complete, the patient is apathetic, has convulsions, and œdema sets in. The œdema is increased by compression thromboses in the pelvic veins, resulting from firm infiltration of the parametral connective tissue. Gradually these also narrow the rectum, causing fæcal stasis, hemorrhoids, and tenesmus.

The general condition suffers, the appearance is cachectic; there is reflex dyspepsia. Death takes place from exhaustion, uræmia, or peritonitis.

Diagnosis.—The portio vaginalis must be examined in the speculum (see the plates mentioned above). The tumors bleed with extreme facility and tenacula which are inserted tear out.

In ulcer of the cervix the os is found intact and closed, while the cervical canal is converted into a dilated ichorous cavity. This is demonstrated by the aid of the sound, which also discloses the degeneration of the walls of the dilated cavity of the uterus. The ulcers are sharply cut out, with a lardaceous surface, reddened and swollen edges, and bleed easily. Such ulcers are found particularly in the vaginal fornix, to which they have spread from the portio.

A positive diagnosis is afforded by microscopical examination of detached shreds or particles which have been scraped from the walls (see Plate 7, Figs. 2 and 3).

A careful clinical history should be taken in order to avoid errors of diagnosis. In this way we would be guarded, from the start, against false ideas in cases of decomposed fœtus or retention of the placenta. In such cases, moreover, microscopical examination would show villi of the chorion and decidual tissue (see "Atlas of Obstetrics," Figs. 58, 59). A gangrenous fibromyoma is recognized by the firm resistance on scraping off test particles and by the fibrous histological structure. We must also bear in mind the rare multiple condylomata of the portio, which are not yellow, as in epithelioma, but bluish-red, and have the same origin as those of the vulva.

It is also to be noted that obstinate endometritides of the menopause, which are diagnosed as fungous under the microscope, are often the beginnings of glandular cancer or, if protracted, furnish a predisposition to cancer. In like manner papillary erosions and laceration cicatrices furnish a predisposition to cancerous papillary tumors.

Treatment.—Immediate operative removal of the suspected masses is indicated, the knife being passed deep into the healthy tissues, at least 1-2 cm. from the border of the tumor.

Prophylaxis consists of thorough cure of endometritides, erosions, laceration cicatrices, and ectropion.

If a cancrerous papillary tumor is surely confined to the portio (see Plates 49-51; 57, Fig. 2; 59), we remove one or both lips, and if necessary the cor-

responding affected part of the vaginal fornix. But
if we have to deal with ulcer of the cervix, it
seems to me that the only safe plan is total extirpa-
tion of the uterus. Even if the tumor has not ex-
tended to the internal os, supravaginal amputation of
the cervix per vaginam, which was formerly em-
ployed, is attended by the fear of a return of the
growth in the body of the uterus or in the shape of
metastases. These metastases do not develop neces-
sarily in immediate contact with the borders of the
tumor. We have specimens which show that at a
quite early period carcinomatous degeneration may
be present in the corpus, fundus, and cervix uteri, at
the same time.

Total extirpation may be performed: (1) from the
vagina, kolpohysterotomy of Langenbeck-Czerny; (2)
as kœliohysterotomy after opening the abdomen
(Freund); (3) after sacral (Hochenegg, Herzfeld, He-
gar) or parasacral division (Wölfler).

In addition to the full bath, free evacuation of the
bowels by means of enemata and laxatives, and evacua-
tion of the bladder immediately before the operation,
the preparation consists in washing and scrubbing
the vagina and uterine cavity several times with anti-
septics.

1. Vaginal Extirpation.

By means of Simon's grooved specula (one pos-
terior, one anterior, and two lateral retractors) the
portio is made accessible and drawn down by ligature.
If the parametral tissue is infiltrated, the uterus can be
moved very little or not at all, so that the idea of re-
moving all the diseased parts cannot be entertained.

The ligature of the portio also closes the external os and thus prevents the discharge of infectious masses in intra-uterine carcinoma. In papilloma of the portio, as much cancerous tissue as possible is removed with the knife, scissors, and sharp spoon before opening the fornix, and the bleeding remainder made as innocuous as possible by the use of Paquelin's cautery and carbolic acid. Then an antiseptic irrigation of the genital canal is again made.

The portio is now circumcised and separated from the bladder and Douglas' sac is opened (Czerny). Or, according to v. Winckel, spiral incisions are made until we come in contact with the peritoneum. The body of the uterus is flexed and drawn, by the fundus, through the opening. The uterine and spermatic vessels are tied by passing at least three ligatures, on each side, through the broad ligaments, the first including the tube and ovarian ligament, the second the ovarian and round ligaments, the third the round ligament and fornix. If the appendages can be drawn down so that the ovaries are removable, this should be done.

Olshausen draws the uterus down *in situ* without flexion; when the organ was excessively dilated P. Müller divided it in the middle and then removed it in two longitudinal halves. Fritsch first makes lateral incisions, ties the uterine arteries, unites the incisions by anterior and posterior incisions in the fornix, applies a rubber ligature, opens the peritoneum anteriorly, and pushes the uterus through.

The main point is that the operator should not go too far toward the bladder or rectum and thus fail to reach the peritoneum.

If the vagina is narrow, lateral incisions are made in the constrictor vaginæ muscles or the entire perineum with the recto-vaginal septum is divided. For this reason Zuckerkandl recommended theoretically that the operator should pass from the perineum through the septum into Douglas' sac.

After removal of the uterus from the ligated appendages, the wound in the fornix is drained with iodoform gauze and its size reduced by the insertion of a few sutures. The patient must remain in bed for two to three weeks.

2. Total Extirpation by Kœliotomy.

The operation devised by Freund is indicated even at the present time when the tumor is very large and firm or complicated with fibromyoma, and cannot be removed through the vagina. The best plan is Bardenheuer's modification: first make a circumcision from the vagina, then apply threefold ligatures to the ligaments, after opening the abdominal cavity, remove the uterus, and close the wound.

3. The sacral and parasacral method may be adopted in cases of adhesions and parametral cancer nodules or very large (also puerperal) uterus. In the left Sims' position (see "Atlas of Obstetrics," Fig. 32 b) a cutaneous incision is made from the right inferior posterior spine of the ilium over the crista sacralis to the vicinity of the anus, and extending down to the sacrum. The coccyx is then removed with the osteotome and the tuberoso-sacral ligament detached. After division of the prevertebral fascia to the right of the rectum we reach the bluish vagina, whose fornix is pushed into the wound by the assist-

ant. Douglas' sac is now incised and the uterus drawn out. Ligature of the ligaments as above and division of the uterus on both sides, after which the anterior peritoneal fold is divided toward the bladder. Then the peritoneum of Douglas' sac and of the bladder is sutured over the uterus and vagina, so that the latter, with the stumps of the ligaments, are now extraperitoneal. The tumor is then removed and the vagina closed. Iodoform-gauze drainage.

The symptomatic treatment is confined to cases which are not susceptible of operation.

1. The gangrene is treated by removal of the carcinomatous masses with the knife, scissors, curette, and thermo-cautery. As a raw surface, which later acquires malignant granulations, is left over, it is advisable to close the wound with sutures, as far as possible, and thus to subject the granulations to a pressure which will interfere with their excessively rapid proliferation. In curetting we must avoid the production of fistulæ into the bladder or rectum.

Among the caustics I would recommend concentrated carbolic acid only, especially in cases which cannot be curetted. Schröder applied twenty per cent bromalcohol for five minutes by means of cotton tampons, beneath which were placed tampons dipped in a solution of sodium chloride; thirty per cent of nitrate of lead in powder (with lycopodium) acts more slowly (twelve to sixty hours).

To relieve the fetid odor we use several irrigations a day with strong solutions of permanganate of potassium (dark reddish-brown) or one per cent creolin. Chinoiodine and aristol may be applied daily in powder.

2. Against the hemorrhages the treatment is palliative, viz., irrigation with astringent solutions or the introduction of suppositories, vinegar, alum, iron chloride, or tamponing with iodoform gauze.

The general nutrition must be carefully regulated. Easily digested and spicy food with stomachics (tinctura cinchonæ compositum), hæmatogen, hæmalbumin, iron peptone wine, etc., are given; laxatives and high enemata, if necessary with infusion of senna.

3. Against the lancinating pains we must resort to the effective but not too early use of narcotics in an ascending series: sulfonal, trional, urethane, chloralamid, by the mouth; antipyrin, extractum hyoscyami, extractum belladonnæ, chloral hydrate, laudanum, in the shape of enemata, and, at a later period, by mouth. Finally, morphine is given subcutaneously in gradually increasing doses.

4. The vomiting is checked by the administration of stomachics, including decoction of condurango, pieces of ice, cold milk (buttermilk), cold champagne.

5. Headache is relieved by cool compresses and antipyrin. The two latter symptoms are also treated by warm baths and diaphoresis, as they may be uræmic in character.

II. Uterine Sarcoma.

Anatomy.—See Plate 47, Fig. 3.

These tumors are perhaps even more malignant than carcinoma. They occur in the body of the uterus primarily or are secondary to ovarian sarcoma and often develop at a youthful age. They consist mainly of a round-cell proliferation, occasionally the cells are spindle-shaped (see Plate 47). They grow

in a villous, polypoid manner and dilate the ostia. Metastases occur through the veins and finally in the shape of pulmonary embolism. Endotheliomata occur very rarely, and only on the portio.

Symptoms.—There are profuse mucous discharges, which are less bloody and foul-smelling than those of cancer, and begin at a late period. Pains do not begin until the os is dilated. With the occurrence of pulmonary metastases, difficulty in breathing and a cyanotic appearance set in. If the hemorrhages are profuse, anæmia develops.

Diagnosis.—There is enlargement of the uterus with or without dilatation of the os (see Plate 53). If undistended, the os should be dilated and the cavity of the uterus palpated in order to detect multiple villous, polypoid excrescences. Exploratory curettage and examination under the microscope (if there is a doubtful fibrous structure, look for giant cells, see Plate 47, Fig. 2) are necessary. It is to be remembered that a fibromyoma may undergo sarcomatous degeneration (see Differential Diagnosis, § 34).

Treatment.—When the discharge is mucous, enucleation is indicated; when the uterus is enlarged, total extirpation. If too far advanced, symptomatic treatment as in carcinoma.

§ 38. MALIGNANT TUMORS OF THE APPENDAGES, ESPECIALLY OF THE OVARIES.

I. Carcinoma.

In regard to the anatomy see Plate 43, Fig. 4. The ovaries are often predisposed to cancerous degeneration as early as the period of puberty (Olshausen).

Symptoms.—These consist of cessation of the menses, ascites, and peritonitic symptoms, rapid marasmus, metastases with circulatory disturbances in the lower limbs, stenosis of the rectum (see Plate 43, Fig. 4).

Diagnosis.—An enlarged, rapidly growing ovary or ascites in a hitherto purely glandular cystoma is suspicious. Exploratory incision and demonstration of papules and multiple diffuse, papillary excrescences in and upon the peritoneum.

Treatment.—Extirpation is indicated if the lesion is confined to the ovary; otherwise only puncture if the pressure symptoms are severe.

Primary glandular carcinoma of the tubes is extremely rare and cannot be diagnosed as such.

II. Sarcoma.

We find usually spindle-cell tumors at an early age, combined with round-cell deposits and degenerations of a myxomatous or carcinomatous character. They grow slowly and their diagnosis and treatment are the same as those of ovarian ·fibroma (see §§ 33 and 35). Sarcomata may also occur upon the ligaments.

Endothelioma (angiosarcoma) may grow to a considerable size and assume a decidedly malignant character. It exhibits a cavernous structure, usually in a myxomatous tissue.
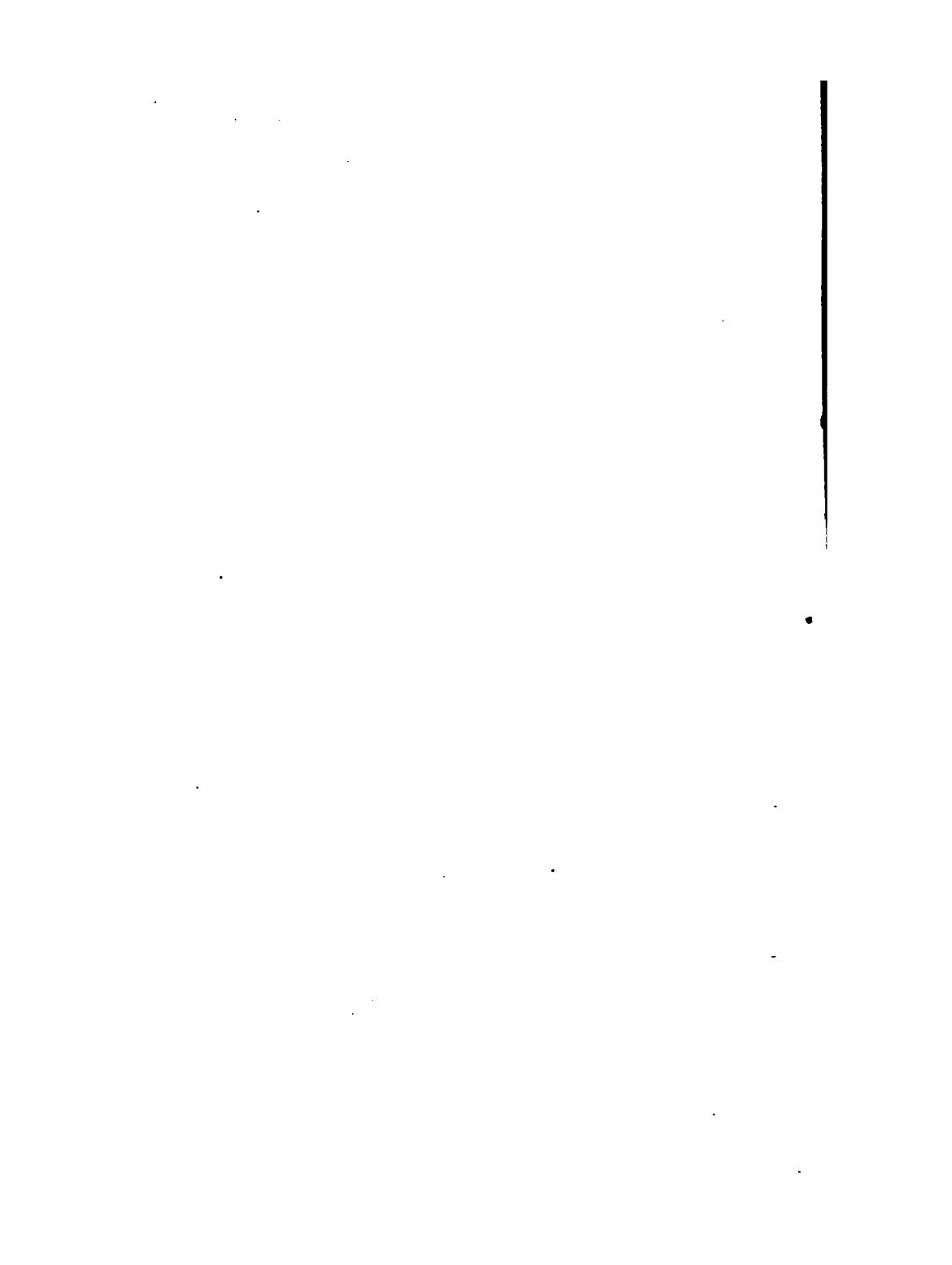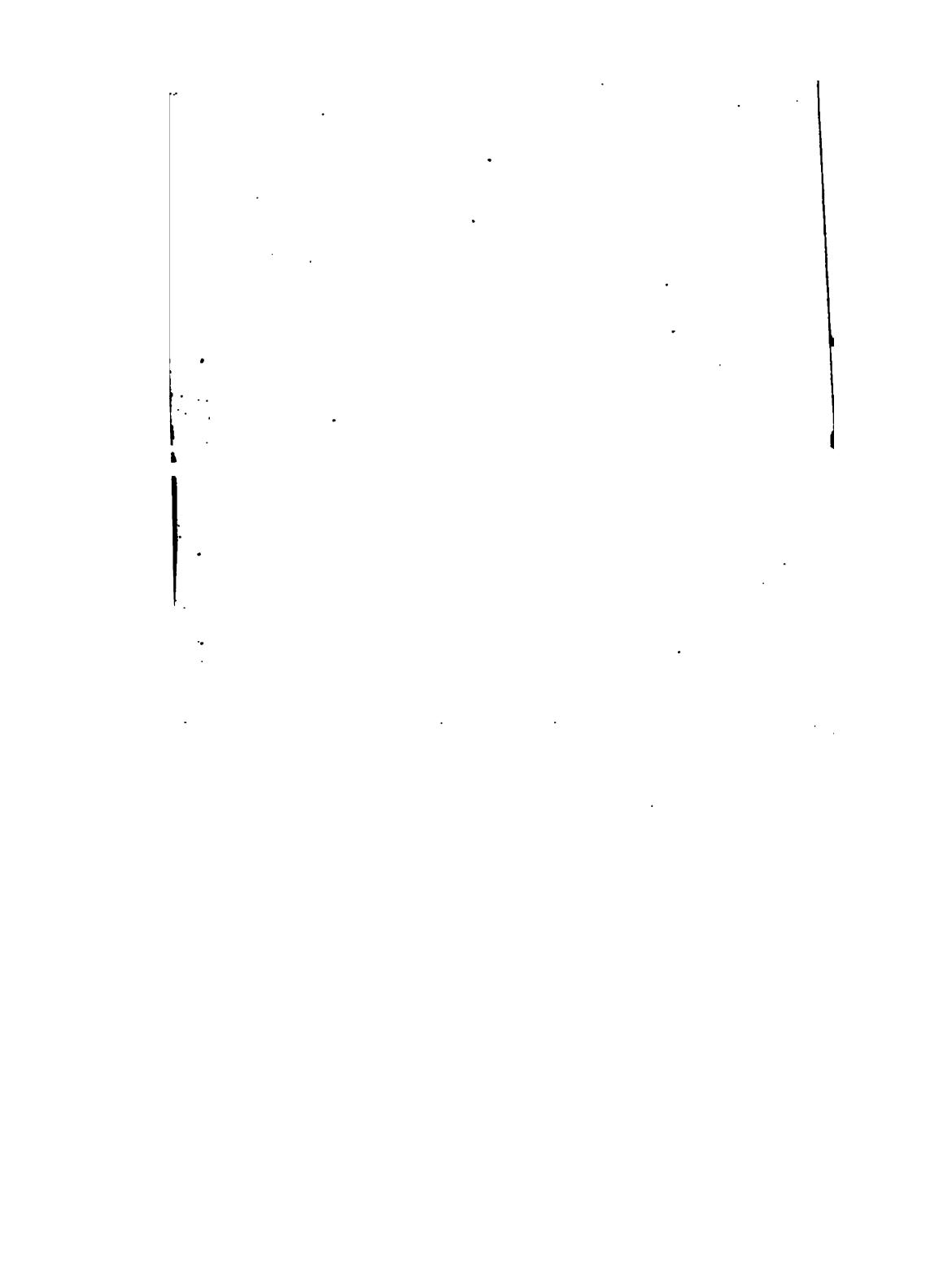
WOOD'S MEDICAL HAND ATLASES.

I.

Atlas of Ophthalmology and Oph-
Diagnosis.

B

102

Atl

ing

A